

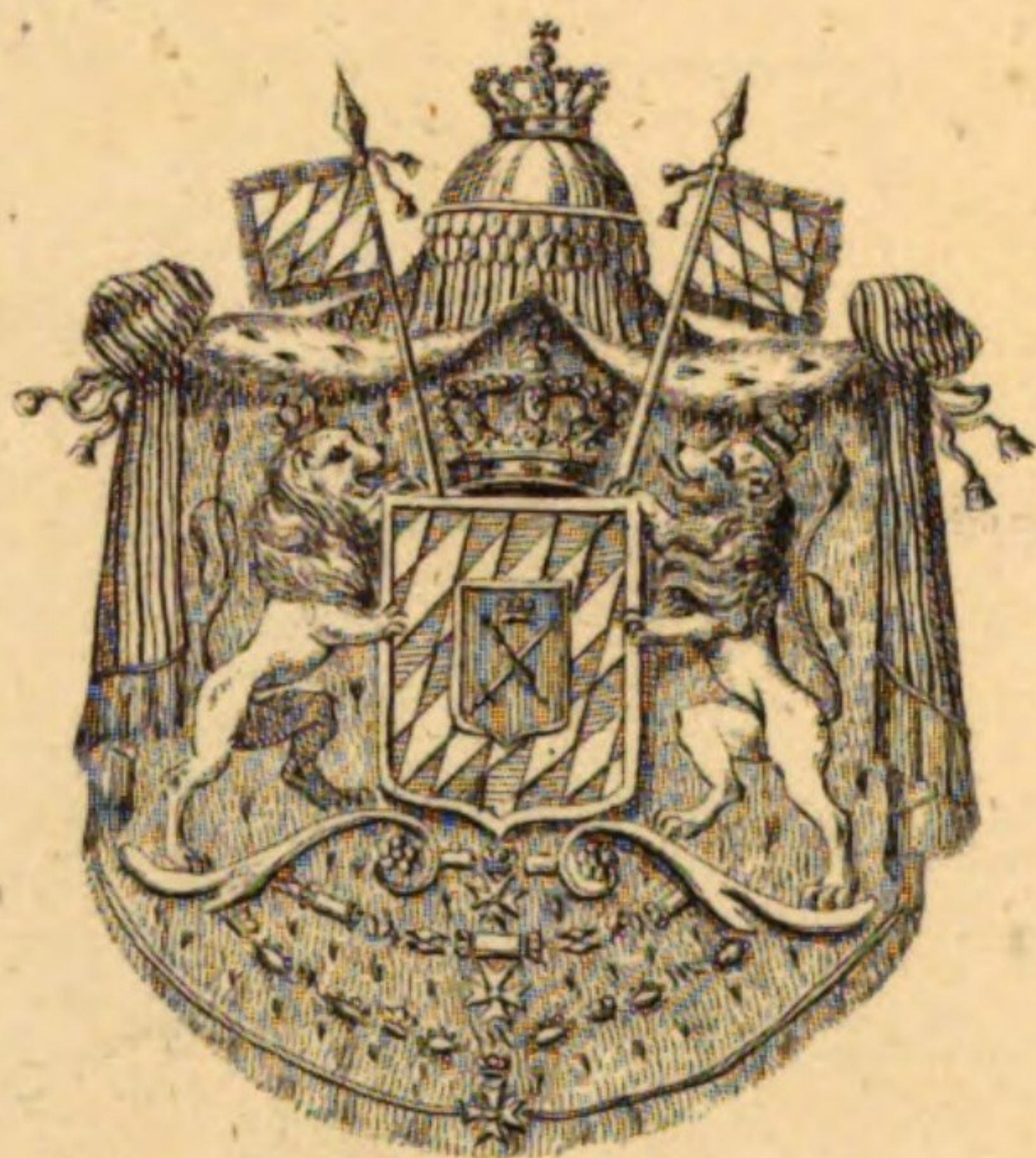
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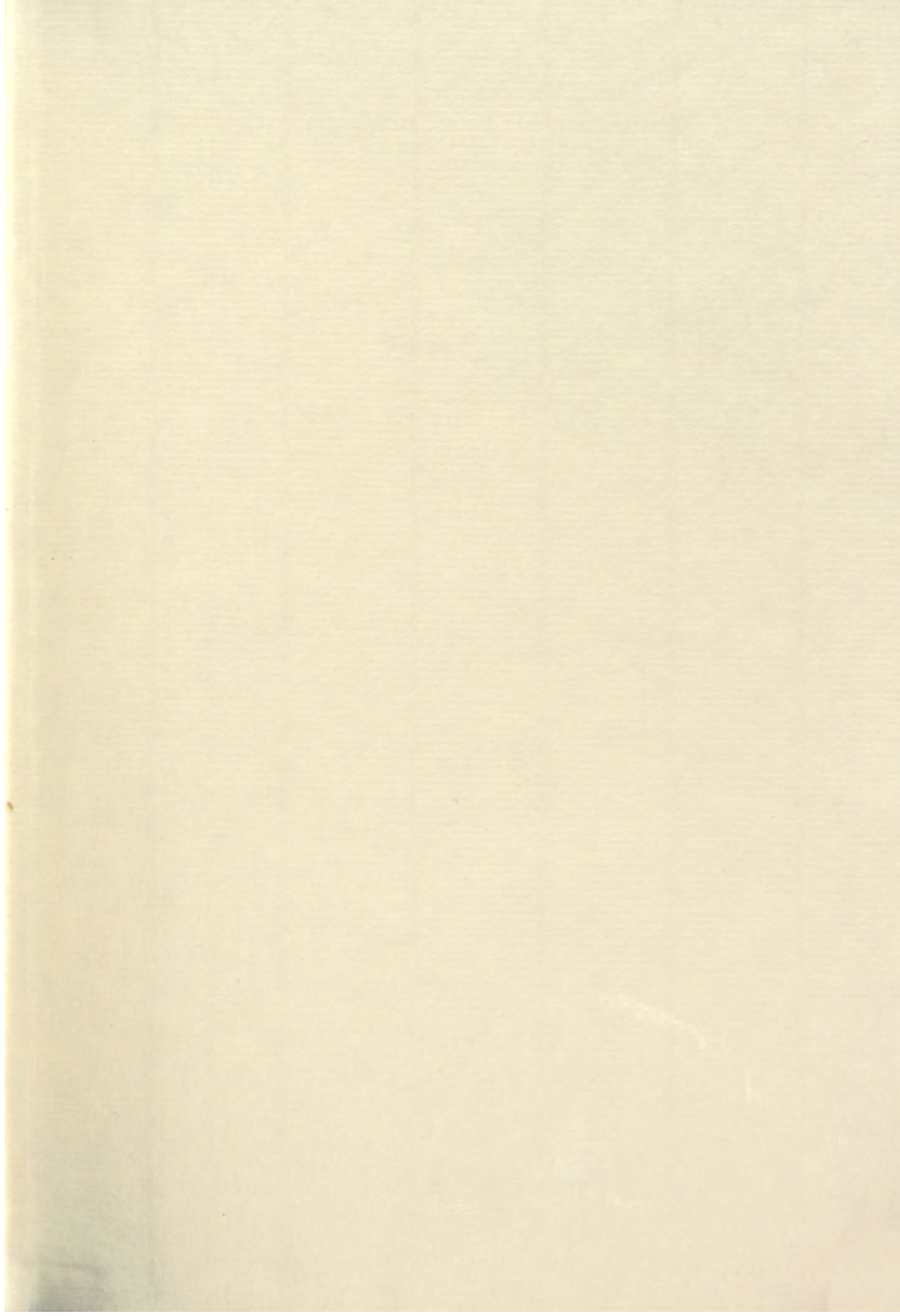
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AMERICAN

MEDICAL BOTANY

BY J. M. ROBERTSON

AMERICAN

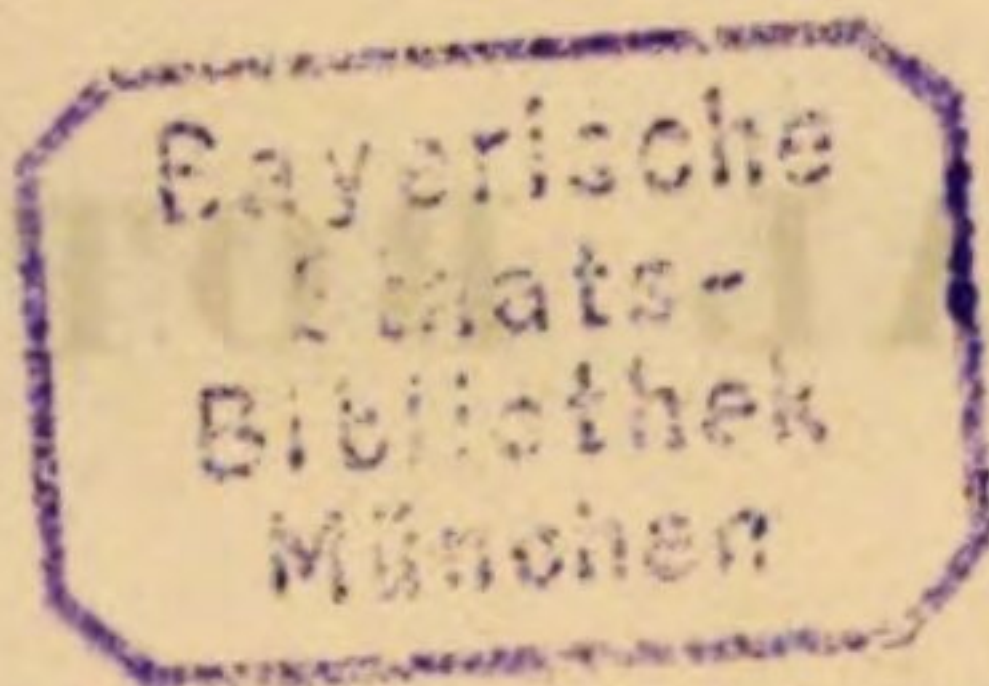
MEDICAL BOTANY.

VOLUME II.—PART II.

AMERICAN
MEDICAL BOTANY.

VOLUME II.—PART II.

M, med. 121 ^m / 4





Liriodendron tulipifera

AMERICAN
 MEDICAL BOTANY.

LIRIODENDRON TULIPIFERA

Tulip Tree.

PLATE XXXI

The vegetable world hardly offers a more
 interesting object, than a tree of colossal stature
 and extensive shade, covered with a beautiful and
 singular foliage, putting forth from its branches an
 immense number of large and fragrant flowers,
 at the same time that it is one of the most
 useful species of wood and its bark is a
 most useful species of medicine. Such is the Tulip
 tree of the United States.

The forests of the Middle and Western States,
 according to the representation of Michaux, are
 bound with the Liriodendron tulipifera, as are like-
 wise the elevated parts of Carolina and Georgia.
 It is found in the New England states, but is
 principally confined to the southern parts of them.

Liriodendron tulipifera

MEDICAL BOTANY

LIRIODENDRON TULIPIFERA

Tulip Tree

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The vegetable world can hardly offer a more interesting object than a tree of exalted stature and extensive shade, covered with a beautiful and singular foliage, putting forth its boughs an immense number of large and variegated flowers, at the same time that its trunk affords one of the most useful species of wood, and its bark an aromatic medicinal agent. Such an one is the Tulip tree of the United States.

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AMERICAN
MEDICAL BOTANY.

LIRIODENDRON TULIPIFERA.

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PLATE XXXI.

THE vegetable world can hardly offer a more interesting object, than a tree of exalted stature and extensive shade, covered with a beautiful and singular foliage, putting forth from its boughs an immense number of large and variegated flowers, at the same time that its trunk affords one of the most useful species of wood, and its bark an aromatic medicinal agent. Such an one is the Tulip tree of the United States.

The forests of the Middle and Western States, according to the representation of Michaux, abound with the *Liriodendron tulipifera*, as do likewise the elevated parts of Carolina and Georgia. It is found in the New England states, but is principally confined to the southern parts of them.

Cultivated trees are common in Boston and its vicinity, but I have never met with it in the woods of this part of the country, nor to the north of it upon the sea board.

In point of size the Liriodendron is exceeded by few trees of the North American forest. Its growth is regular, straight and majestic. Its trunk often acquires a diameter of from two to three feet, and an elevation of eighty or ninety. In favourable situations it frequently exceeds these dimensions. Michaux measured a tree near Louisville in Kentucky, which at five feet from the ground was twenty two feet and an half in circumference, and which he estimated to be a hundred and twenty or a hundred and forty feet in height. Catesby informs us that the circumference is sometimes thirty feet.

The names of *Tulip tree*, *White wood*, *Canoe wood*, and *Poplar* are applied to this tree in different parts of the United States. Its flowering time is in the months of May and June.

The genus Liriodendron, to which Linnæus has assigned four species of trees, is characterized by a double calyx, the outer of two, the inner of three leaves; petals six, seeds imbricated into a cone.

The species *tulipifera*, the only one in America, is remarkably distinguished by its *lobed and truncated leaves*.

Together with several other of our finest flowering trees and shrubs, the *Liriodendron* is found in the class *Polyandria* and order *Polygynia*, and the natural orders *Coadunatae* of Linnæus and *Magnoliæ* of Jussieu.

The branches of the Tulip tree are of a greyish colour inclining to red. The buds which terminate them in winter are very curiously constructed. They are obovate, and flattened or compressed into a sharp edge at the extremity. They are made up of a number of concentric sheaths, each of which contains a single miniature leaf between it and the next interior sheath. This leaf, instead of embracing the next sheath, is folded up and bent down upon one side of it. When vegetation begins in the spring the sheaths swell to a large size before bursting, and at length liberate the leaves one at a time, the remains of each sheath becoming converted into a stipule. The leaves of the Tulip tree have a form altogether peculiar, and which is not resembled by any other production of our forests. They are divided into four pointed lobes and terminated by a shallow notch, the extremity being nearly

square, and the middle rib ending abruptly, as if cut off. In the large leaves, the two lower lobes are furnished with a tooth or additional lobe on their outside. They are attached by long peduncles and have a beautifully smooth and bright green surface. There is one variety of this tree which has the lobes of its leaves not pointed, but very obtuse. The flowers are large, solitary, and terminal. The outer calyx has two triangular leaves which fall off as the flower expands. The inner calyx consists of three large, oval, concave, veined leaves, of a pale green colour, spreading at first, but afterwards reflexed. Petals six, sometimes more, obtuse, concave, veined, of a pale yellowish green, marked with an irregular, indented crescent of bright orange on both sides toward the base. Stamens numerous, with long linear anthers opening outwardly, and short filaments. Pistil a large, conical, acute body, its upper half covered with minute, blackish, recurved stigmas; its lower furrowed, being a mass of coalescing styles and germs. The fruit is a cone of imbricated seed vessels, which are woody and solid, their upper portion formed by a long lanceolate scale. Seeds two, blackish, ovate, one or both often abortive.

The bark of the Tulip tree has a very bitter taste and a strong aromatic pungency. The latter property appears to reside in a volatile oil. When the bark is distilled with water, it fills the apartment with its fragrant odour, yet the product of the distillation, at least when the process is conducted in the small way with the luting of the apparatus not perfectly tight, has scarcely any taste or smell. Dr. Rogers informs us that he obtained an oily matter in the form of a whitish scum on the surface of the water in the receiver. A bitter resin exists in small quantities in the bark. Water dissolves a mucous substance, which is precipitated in a flocculent form by alcohol. Water is also impregnated with the bitterness, and, if too much heat be not employed, with some of the aroma of the tree. The sulphate of iron produced a dark brown colour, but a solution of isinglass did not increase the chemical evidence of astringency, producing a barely perceptible effect. Alcohol and proof spirit may be considered the most perfect solvents of the active ingredients of this article, although water dissolves enough to produce its medicinal effect.

The bark both of the root and branches acts on the system as a stimulating tonic and diaphoretic, having properties resembling the Cascarilla

and other aromatic barks of the shops. The disease in which it has been most employed is intermittent fever. But the triumph which results from the occasional cure of this disease is now divided among so large a list of tonic medicines, that the distinction conferred by it is not of the most signal kind. As a warm sudorific, this bark seems well adapted to the treatment of chronic rheumatism, and for this purpose it has been employed with success by various medical practitioners in the United States. In some diseases of an inflammatory type in which it has been recommended, its stimulating properties render it more like to do harm than good. The only personal acquaintance which I have had with it, is as a stomachic. Administered with this view, it has been acceptable and apparently useful to patients who had derived occasional benefit from "Huxham's tincture," "Stoughton's elixir," and similar compositions of bitter and aromatic drugs.

The wood of the Tulip tree is smooth and fine grained, very easily wrought and not liable to split. It is used for various kinds of carving and ornamental work, and for articles of house furniture. In the Western States where pine lumber is scarce, Michaux tells us, that the joinery or inside work of houses is most frequently of this

material. A common use of it throughout the United States is in the manufacture of carriages to form the pannels of coach and chaise bodies. For this purpose it is particularly fitted by its smoothness, flexibility and toughness.*

The true or heart wood of this tree is of a yellowish colour and differs in proportion in different trunks. We are told that two varieties of the tree exist, denominated the yellow and the white, and which appear to be in some measure produced by the mode and place of growth. The yellow variety is most valuable, having least alburnum and being less subject than the other to decay.

The Tulip tree has been long since introduced from this country into the forests and fields of Europe. Its use, ornamental appearance, and the facility with which it is raised, have rendered it one of the most prominent and interesting objects of forest cultivation.

* The various economical uses of this tree are treated of at large in the splendid work of the younger Michaux on the *Forest trees of North America*. Those who appreciate the value of a correct knowledge of the various internal resources of our country, will be gratified that a translation of this important work, with the original plates, is now publishing at Paris and Philadelphia.

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PLATE XXXI.

Fig. 1. *A branch of Liriodendron tulipifera.*

Fig. 2. *Stamens presenting different sides.*

Fig. 3. *Pistil.*

Fig. 4. *Fruit.*

Fig. 5. *One of the seeds with its scale or envelope.*

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1892

PLATE XXII

- Fig. 1. A branch of *Salix purpurea* L.
Fig. 2. A branch of *Salix purpurea* L. showing different sides.
Fig. 3. A branch of *Salix purpurea* L.
Fig. 4. A branch of *Salix purpurea* L.
Fig. 5. One of the seeds with its style in envelope.



Juglans cinerea

JULIAN'S CINEREA

Butternut.

WALNUT.

Of the forest trees which deserve attention for other properties than the uses of their timber, the Butternut is undoubtedly one of the most interesting; its inner bark and pores being all convertible to use. In favourable situations it becomes a large tree, attaining frequently a trunk of three feet in diameter. It is abundant in the Northern and Middle States, as well as in the Western country. Some parts of the District of Maine, I am told, produce woods of considerable extent, containing wholly of this tree. Michaux tells us, that it is common in the states of Kentucky and Tennessee, and that it abounds on the banks of Lake Michigan, Ohio and even the Missouri. The same author states that it is found in the mountainous



JUGLANS CINEREA

FRUIT

PLATE LXXV

Of the forest trees which deserve attention for other properties than the uses of their timber, the Butternut is undoubtedly one of the most interesting. Its fruit, bark and juice being all valuable to use. In favorable situations it becomes a large tree, bearing frequently a trunk of three feet in diameter. It is abundant in the Western and Middle States, as well as in the Eastern country. Some parts of the District of Maine, and cold, barren woods of considerable extent, containing wholly of this tree. Michx. tells us that it is common in the state of Kentucky, and remarks that it abounds in the hills of that state. The tree is found in the Western and Eastern parts of the United States.



Juglans cinerea

Annis & Smith Sc.

JUGLANS CINEREA.

Butternut.

=

PLATE XXXII.

OF the forest trees which deserve attention for other properties than the uses of their timber, the Butternut is undoubtedly one of the most interesting; its fruit, bark and juices being all convertible to use. In favourable situations it becomes a large tree, having frequently a trunk of three feet in diameter. It is abundant in the Northern and Middle States, as well as in the Western country. Some parts of the District of Maine, I am told, produce woods of considerable extent, consisting wholly of this tree. Michaux tells us, that it is common in the states of Kentucky and Tennessee, that it abounds on the banks of Lake Erie, the Ohio and even the Missouri. The same author states that it is found in the mountainous

parts of Carolina and Georgia, but that he has not met with it in the lower or level portions of the Southern States. It is variously known by the names of *Butternut*, *Oilnut* and *White Walnut*.

The genus *Juglans* or *Walnut* appertains to the Linnæan class *Monœcia* and order *Polyandria*. Its natural orders are *Amentaceæ* of Linnæus and *Terebintaceæ* of Jussieu.

This genus has its *barren flowers in aments with a six-parted calyx*; its *fertile flowers with a four-cleft superior calyx*; a *four-parted corolla*; *two styles*; and a *coriaceous drupe with a furrowed nut*.

The species *cinerea* has its *leaflets numerous, oblong-lanceolate, rounded at base, downy underneath, serrate*. *Fruit oblong-ovate with a terminal projection, viscid and hairy*; *nut oblong, acuminate, with a rough, indented and ragged surface*.

The leaves of the *Butternut* tree when fully grown are very long, consisting of fifteen or seventeen leaflets, each of which is two or three inches long, rounded at base, acuminate, finely serrate and downy.

The flowers appear in May before the leaves are expanded to their full size. The barren flowers hang in large aments from the sides of the last year's shoots, near their extremities. The

scales which compose them are oblong and deeply cleft on each side into about three teeth or segments. The anthers are about eight or ten in number, oblong and nearly sessile. The fertile flowers grow in a short spike at the end of the new shoot. They are sessile and universally pubescent and viscid. When fully grown, they seem to consist of a large oblong germ and a forked feathery style. The top of the germ, however, presents an obscurely four-toothed calyx. Within this is a corolla of four narrow lanceolate petals growing to the sides of the style. The style divides into two large, diverging, feathery stigmas nearly as long as the germ. These flowers are somewhat later than the aments in their appearance. The fruit is sessile, several together on the sides and extremity of a long peduncle. It is of a green colour, brown when ripe, oblong-oval, pointed, hairy and extremely viscid. It contains a nut which is of a dark colour, carinated on both sides, sharp pointed, its whole surface roughened by deep indentures and sharp prominences. The kernel is more regular than in most nuts of its kind, is very oily, pleasant to the taste when fresh, but acquires a rancid taste by age.

The bark of the branches affords a large quantity of soluble matter, chiefly of the extractive kind. In a concentrated tincture I have not been able to detect any appearance of resin. No evidence of tannin is produced by the test of gelatin. A brownish black colour is caused by the sulphate of iron. The distilled water possesses the taste of the bark in a considerable degree. We are authorized to conclude that water is an adequate solvent for this article, and experience has shewn that the watery extract is one of its best preparations.

The sap of the Butternut tree is saccharine, like that of the Maple, and may be procured in large quantities. In the third volume of the Massachusetts Agricultural Repository is an account of an experiment made on this tree by Mr. M. P. Gray. He states that four trees, the trunks of which were only from eight to ten inches in diameter, produced in one day nine quarts of sap, from which was made one pound and a quarter of sugar. This quantity, it appears from his statement, is equal if not superior to that which the maple affords in the same vicinity.

The inner bark of this tree, especially that obtained from the root, affords one of the most mild and efficacious laxatives which we possess. It is

commonly employed in the form of an extract, which preparation is kept in our druggists' shops. Ten or twelve grains of this extract operate gently, and twenty or thirty grains with considerable activity on the bowels. It has been used for many years in this town by the most respectable practitioners. The late Dr. Warren thought highly of its efficacy, and employed it extensively in various complaints, especially in dysentery. During the revolutionary war, when foreign medicines were scarce, this extract was resorted to by many of the army surgeons, as a substitute for more expensive imported drugs. In dysentery it seems at one time to have acquired a sort of specific reputation.

From numerous trials which I have made with this medicine, it appears to me to possess the qualities of an useful and innocent laxative. When fresh and properly prepared, it is very certain in its effect, and leaves the bowels in a good state. In cases of habitual costiveness it is to be preferred to more stimulating cathartics, and many persons whose state of health has rendered them dependent on the use of laxative medicines, have given this the preference after the trial of a variety of other medicines.

A patent medicine, long vended in this state under the name of Chamberlain's Bilious Cordial, was a tincture of this bark combined with various aromatic seeds.

The bark is said to be rubefacient when externally applied, and even capable of exciting a blister. Of this I have had no experience.

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PLATE XXXII.

Fig. 1. A branch of *Juglans cinerea* in flower, the leaves not fully expanded.

Fig. 2. A scale or barren flower from the ament magnified.

Fig. 3. A fertile flower magnified.

Fig. 4. The fruit.

A patent medicine, long vended in this state
under the name of Chamberlain's Bilious Compound,
was a tincture of this bark combined with various
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1801. 112.

PLATE XXII

Fig. 1. A branch of *Juglans cinerea* in flower, the leaves not fully
expanded.
Fig. 2. A scale or bract, taken from the inner husk of the
Fig. 3. A single flower magnified.
Fig. 4. The fruit.



Veratrum viride Annin & Smith Sc.

VERATRUM VIRIDE

American Hellebore

PLATE XXXIII

In many parts of the United States the swamps and wet meadows, which have been converted into mowing lands, are peculiarly marked in the early part of spring by two species of plants. These are the *Lolium fetidum* already described (Pl. 312) and *Veratrum viride*, usually denominated *Poke root* and *Hellebore*. Both of these plants spring up more rapidly than the grass around them, and from the largeness and bright green colour of their leaves they are often the most remarkable objects in the places of their growth. As the season advances, the *Lolium* continues only a tuft of radical leaves, while the *Veratrum* sends up a straight leafy stalk, which frequently acquires the full height of a man.



Veratrum viride

Annis & Smith Sc.

VERATRUM VIRIDE.

American Hellebore.

PLATE XXIII.

In many parts of the United States the swamps and wet meadows, which have been converted into mowing lands, are peculiarly marked in the early part of spring by two species of plants. These are the *Ictodes fœtidus* already described (Pl. xxiv) and *Veratrum viride*, usually denominated *Poke root* and *Hellebore*. Both of these plants spring up more rapidly than the grass around them, and from the largeness and bright green colour of their leaves they are often the most noticeable objects in the places of their growth. As the season advances, the *Ictodes* continues only a tuft of radical leaves, while the *Veratrum* sends up a straight leafy stalk, which frequently acquires the full height of a man.



VERATRUM VIRIDE

American Hellebore

PLATE XXXIII

In many parts of the United States the ground is covered with a low, spreading plant, which has been sometimes mistaken for the true hellebore. It is a perennial, and its leaves are generally rounded in the base, and spring by two opposite of plants. These are the leaves of the hellebore already described (Pl. 187) and Veratrum viride, usually distinguished by its root and hellebore. Both of these plants spring up more rapidly than the grass around them, and from the largeness and bright green colour of their leaves they are often the most noticeable objects in the places of their growth. In the season of summer, the hellebore contains only a tuft of radical leaves, while the Veratrum sends up a straight leafy stalk, which frequently attains the full height of a man.



Veratrum viride Annin & Smith Sc.

VERATRUM VIRIDE.

American Hellebore.

PLATE XXXIII.

IN many parts of the United States the swamps and wet meadows, which have been converted into mowing lands, are peculiarly marked in the early part of spring by two species of plants. These are the *Ictodes foetidus* already described (Pl. xxiv) and *Veratrum viride*, usually denominated *Poke root* and *Hellebore*. Both of these plants spring up more rapidly than the grass around them, and from the largeness and bright green colour of their leaves they are often the most noticeable objects in the places of their growth. As the season advances, the *Ictodes* continues only a tuft of radical leaves, while the *Veratrum* sends up a straight leafy stalk, which frequently acquires the full height of a man.

This plant is not only found in boggy meadows, but by the sides of brooks in rocky and mountainous situations, from Canada to Carolina. Its flowering time is from May to July.

The *Veratrum album* or *White Hellebore*, a well known medicinal plant found in most countries of Europe, has a very close resemblance to the American species. It is, however, a smoother plant, and differs somewhat in its flowers, bractes and stalks.

The genus *Veratrum*, on account of the diversity of its flowers, was placed by Linnæus in his class *Polygamia* and order *Monœcia*. Those more recent botanists, who omit this class, have transferred the genus to *Hexandria trigynia*.

The generic character of *Veratrum* consists in a six-parted corolla without calyx. Stamens inserted in the receptacle. Capsules three, many seeded. A part of the flowers barren. The species *viride* has a downy panicle with the partial bractes longer than their pedicels. Segments of the corolla thickened on the inside at base.

The root of this plant is thick and fleshy, its upper portion tunicated, its lower half solid and sending forth a multitude of large whitish radicles. The stem is from three to five feet high, roundish, solid, striated and pubescent. Through-

out the greater part of its length it is closely invested with the sheathing bases of the leaves. The lower leaves are large, from half a foot to a foot long, oval, acuminate, pubescent, strongly plaited and nerved; the lower part of their edges meeting round the stem. The upper leaves become gradually narrower and the uppermost, which perform the office of bractes, are linear-lanceolate. The flowers are numerous and distributed in compound racemes axillary from the upper leaves, and terminal; the whole forming a sort of panicle. Peduncles roundish, downy. Bractes boat-shaped, acuminate, downy. The pedicel of each flower is many times shorter than its bracte. Calyx none. Corolla divided into six green, oval, acute, nerved segments, of which the alternate ones are longest. All the segments are contracted at base into a sort of claw with a thickened or cartilaginous edge. Stamens six with recurved filaments and roundish, two-lobed anthers. Germs three, cohering, with acute recurved styles as long as the stamens. A part of the flowers are barren and have only the rudiments of styles, so that the plant is strictly polygamous. The seed vessel consists of three capsules united together, separating at top and opening on their inner side. Seeds flat imbricated.

The root of the Veratrum has a bitter taste accompanied with acrimony, and leaves a durable impression on the mouth and fauces when it has been chewed or swallowed. It abounds with a resinous juice, which adheres closely to a knife with which the root has been cut. This resin dissolves abundantly in alcohol. When water is added to the solution, a white turbidness gradually appears rendering the liquid opaque, but without sediment. The decoction has an intensely bitter taste. It is not rendered turbid by alcohol although some slight flocculi are separated after standing. It is probable that this bitterness resides in an extractive principle. The distilled water of the root has a slightly unpleasant taste, without bitterness or pungency.

This plant in its medicinal powers resembles the Veratrum album or White hellebore of Europe. It is an acrid emetic and a powerful stimulant, followed by sedative effects. As a medicine or as a poisonous plant, it has been known from an early period. The aborigines of the country were fully apprized of its activity. Josselyn in his voyage to New England, which took place not long after the first settlement of the country, informs us that the young Indians had a custom of electing their chiefs by a sort of ordeal instituted

with the roots of this plant, which he denominates "white hellebore." A portion of this root was repeatedly given to each individual, and he whose stomach made the most vigorous resistance or soonest recovered from its effects was considered the stoutest of the party and entitled to command the rest.

Kalm tells us that the people of this country, at the time of his travels, employed a decoction of this plant externally in the cure of scorbutic affections, and for the destruction of vermin. He further states, that corn before planting was soaked in a strong decoction of the *Veratrum* to protect it against the birds which infest our fields and devour the grain after it is deposited in the ground. When the corn is thus prepared, it is observed, that those birds which swallow it become giddy and fall to the ground, an example, the writer informs us, which has the effect to frighten the remainder of the tribe away from the place.

Since the celebrity acquired by the European white hellebore as a remedy for gout, that plant being for a time supposed the basis of the celebrated *Eau medicinale*; the attention of some practitioners has been turned to investigating the properties of the American plant, which so close-

ly resembles the *Veratrum album* in its external habitudes. The result of such trials as have been made, establishes beyond a doubt the medicinal similarity of these two vegetables. I have employed the American plant in dispensary practice in the treatment of obstinate cases of chronic rheumatism. Other practitioners have applied it to the treatment of gout, and of cutaneous and other affections. From the sum of my observations and knowledge respecting it, I am satisfied that the root, when not impaired by long exposure and age, is in sufficient doses a strong emetic, commencing its operation tardily, but continuing in many instances for a long time; in large doses affecting the functions of the brain and nervous system in a powerful manner, producing giddiness, impaired vision, prostration of strength and diminution of the vital powers. Like the *Veratrum album* and *Colchicum autumnale*, the violent impression which it makes upon the system has arrested the paroxysms of gout and given relief in some unyielding cases of protracted rheumatism. Like those substances, it requires to be given with great caution and under vigilant restrictions. The solutions of this article have appeared to me more powerful in proportion to their quantity than the substance, probably in consequence of a part of

the powder being thrown out in the first efforts to vomit, before a perfect solution of its active parts in the stomach could have taken place.

A course of experiments with this article was made sometime since in the Boston Almshouse by Dr. John Ware, the results of which he has obligingly communicated to me. They cannot be better stated than in his own words.

"I gave this plant," says he, "in the first place with a view to ascertain its action on the stomach and alimentary canal. The doses in which it was administered amounted to from two to ten grains. I began with a small quantity, and increased it very gradually in order to guard against the occurrence of those violent and dangerous effects which I had been led to apprehend from the descriptions given of the operation of the white hellebore. A slight and general account of the experiments will give the most satisfactory view of the effects of this root as an emetic.

"It was administered in about thirty cases. *In the first case* two grains were given; this only produced slight and temporary nausea.

"*In three* instances three grains were administered; in two of these vomiting was produced; in one of them to a considerable degree—in the other slight—in the third no effect whatever was

produced.—*Of gr. iv.* Four doses, of which only one operated, and then the operation was inconsiderable.—*Of gr. vi.* Fifteen doses were given—ten of these operated perfectly well; as complete and thorough vomiting was produced as follows from the case of any other emetics—in the eleventh case nausea only ensued—and in the remaining, no effect whatever was perceived.—*Of gr. viii.* Four doses—of these, two failed entirely and two operated satisfactorily.—*Of gr. x.* Only one dose was given—this operated very thoroughly.

“I did not find, as I had expected, that this substance was uncommonly violent or distressing in its operation. Patients, in general, did not complain of any thing unusual, and when they were particularly questioned as to their sensations, they told of nothing more than those usually occurring during the effects of a brisk emetic. It seemed to produce vomiting rather more severely than an ordinary dose of ipecac—but not more than one of antimony. Indeed, its operation may fairly be said to be about as violent and distressing as that of any other emetic whose effects in evacuating the stomach are equally thorough. In a few instances, however, there was a complaint of very violent and painful retching—

and of dizziness at the time and for a short time after—still these effects were not common nor excessive.

“As to its influence as an emetic upon diseased states of the system, there were few opportunities of administering it where any considerable derangement existed. In those cases which did occur it did not appear to be inferior to the common emetics.

“The degree of operation did not seem to be much increased by the increase of the dose of the medicine. Doses of six grains appeared, when they took effect, to produce vomiting as thorough and complete, as that which followed from larger doses ; except that the larger were perhaps more speedy in operating. I could find no cause for the failure of so many of those cases in which the dose amounted to six or eight grains, except an insensibility in the patient to the stimulus of the medicine ; and this was rendered more probable from the circumstance that generally in those instances, the substance failed in producing any effect whatever ; nausea did not often occur when vomiting was not to follow it, and in no instance was it very clear that purging was produced.

“Indeed this appeared to be rather a singular circumstance relating to this substance, and one

in which it differs from most or all other emetics. These articles, when they fail of producing vomiting, generally occasion a determination downwards, and thus produce all the phenomena of cathartic medicines. This effect is also frequently produced when they have operated in their peculiar way. But in no instance did this appear to be the case with the Hellebore. Some patients, indeed, said that it operated upon them by stool very slightly—but on strict inquiry I did not think that the medicine had had any effect in this way, and that what was told me proceeded from a desire in the persons to attribute some sort of effect to what had been given them.

“In the greater number of the cases, the Hellebore was longer before it produced vomiting than is the case generally with other emetics. It did not often operate in less than three quarters of an hour or an hour—but sometimes the interval was extended to two or three hours—and in one case, although the dose was administered at twelve at noon, its effects were not produced until between nine and ten o'clock in the evening. This tardiness in manifesting its effects on the system corresponds with what has been observed with respect to the European species.

“I made a few experiments with the powder of the *Veratrum album* in order to compare its powers with those which existed in our native species. It was given in six cases—of two doses of three grains—neither produced any effect—one of four was not more effectual—six grains produced some vomiting, but not to any considerable extent—seven no effect whatever—and eight produced in about four hours after taking it considerable effect. If these experiments are to be depended upon, the foreign certainly is not more powerful than the native species.

“I endeavoured next to ascertain what degree of power the Hellebore was possessed of over cutaneous diseases. It has the reputation in the country of some efficacy in these complaints. The ointment and decoction were applied in a number of cases, and it certainly proved to be an application of considerable power. Its effects in some cases amounted to a removal of the disease entirely—and in most, some diminution of it followed, which was more or less durable.

“In one case where there was an eruption about the wrists and other parts of the body, supposed to be the itch—the ointment (made by simmering together a dram of Hellebore in an ounce of lard) after being applied for some time, removed the

disease. The cure, however, was protracted and tedious.

“A second case was that of a boy who had on the back of his head, what appeared to be the commencement of *Tinea capitis*. The ointment made in the same way as that before mentioned, except that simmering was omitted, removed it in the course of a fortnight. It returned again in the course of a few weeks and was again destroyed by the same application. It did not recur so long as I had an opportunity of observing the child, which was, however, not long.

“In one clear case of itch, the ointment failed of producing any beneficial effect, and it was necessary to have recourse to the usual remedy.

“An instance of a very troublesome and irritating eruption upon the hands and fingers, accompanied by a venereal taint of the system, was very much relieved by this ointment. Its final removal, however, could not be attributed to this, since the patient was under the influence of mercury at the same time.

“In some other cases both the ointment and decoction were used with success for a time, but the effects they produced were only partial and temporary.”

Of the power of this plant to relieve the formidable disease of gout, we have the most satisfactory evidence. A composition intended to imitate the celebrated *Eau medicinale* was prepared in England by Mr. Moore from the wine of white hellebore and wine of opium in the proportion of three parts of the former to one of the latter. This compound was used by many arthritic patients both in Europe and America with great success in relieving the paroxysms of the disease. In Boston a considerable number of individuals have been induced to make trial of the remedy, and generally with advantage. But I am informed by several of our most respectable apothecaries, that for a long time, especially during the late war, when the white hellebore could not be obtained from Europe, the American plant was used in the preparation of the medicine upon the supposition of its being the same with the European. Various gouty patients made use of it, and no difference was perceived by them or their physicians in its mode of operation or effect upon the disease. Some were relieved by small doses, which did not even nauseate, such as fifteen or twenty drops, repeated if necessary. Others found a drachm of the mixture necessary, which quantity affected them unpleasantly by vomiting

or otherwise. Some experienced such severe effects as to deter them after one trial from a repetition of the experiment. In general the paroxysm of gout was completely suspended by the operation of the medicine.

On the whole, we have sufficient knowledge of the American green hellebore, to feel assured that it is a plant of great activity, closely resembling in its properties the *Veratrum album* of Europe ; and that like that plant it has given relief in the paroxysms of gout and in rheumatism. Whether the original *Eau medicinale* be a preparation of *Veratrum*, *Colchicum*, or any other acrid narcotic, it is not of consequence here to decide. These plants, with several others that might be mentioned, are similar in their operation, and probably influence the system when under disease, much in the same way. Some individuals obtain relief from moderate doses, which do not occasion nausea or any very disagreeable effects. Others have not derived benefit except from such quantities as bring on vomiting. Some have experienced very distressing consequences, such as excessive sickness, purging, great prostration of strength, impaired vision, and even total insensibility, where the dose has been imprudently large.

The wine of green hellebore is prepared like that of the white, by infusing for ten days eight ounces of the sliced root, in two pints and an half of Spanish white wine. Before being given, in gout, it is combined with one fourth part its quantity of wine of opium. Of this compound the dose varies from twenty drops to a drachm.

From some observations made by Sir Everard Home respecting the wine of *Colchicum autumnale*, it is probable that the wine of *Veratrum* may be less violent in its effects, if freed from the sediment which it deposits by standing.

Of the substance of the root freshly powdered, from two to six grains will be found a sufficient dose. For medicinal use, however, in most cases it is probable that the liquid preparation above described promises more.

The external application of the ointment and decoction sometimes produces the same effect on the stomach as the internal use of the plant. In one instance a patient was nauseated and vomiting brought on by the ointment applied to an ulcer of the leg. I have known similar consequences from a strong decoction in cutaneous affections. Might the topical application of this plant be of any service in gout?

BOTANICAL REFERENCES.

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MEDICAL REFERENCES.

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PLATE XXXII.

Fig. 1. Leaf and flowers of *Veratrum viride*.

Fig. 2. Petal magnified.

Fig. 3. Stamens.

Fig. 4. Pistils.

Fig. 5. Capsule.

Fig. 6. Section of the capsule, showing the seeds.

Fig. 7. A seed.

BOTANICAL REFERENCES

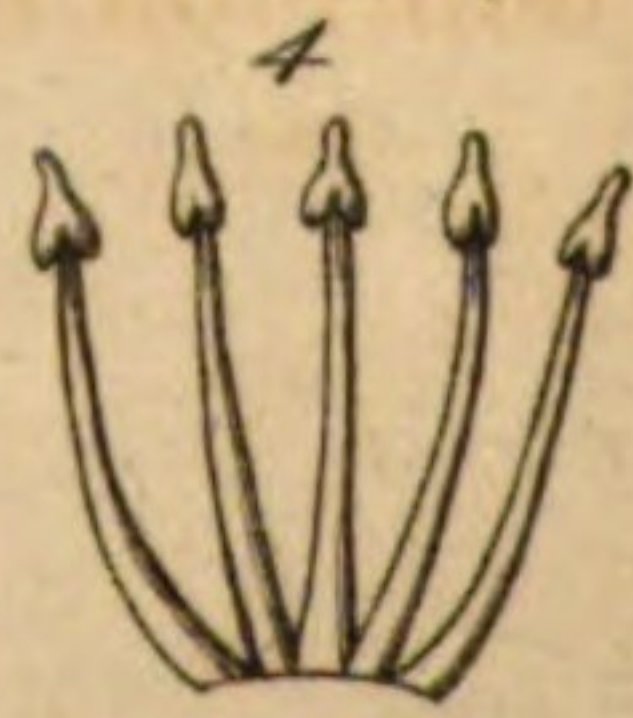
Veratrum viride, Aiton, *Bot. Brit.* 1789, p. 100.
Veratrum album, Michx., *Bot. Beech.* 1822, p. 242.
Veratrum album, Michx., *Bot. Beech.* 1822, p. 242.

MEDICAL REFERENCES

Kalm, *Reise in Nordeuropa*, 1746, p. 100.
 Thunberg, *Bot. Fries.* 1794, p. 100.

PLATE XXII

- Fig. 1. Leaf and flower of *Veratrum viride*.
- Fig. 2. Petal magnified.
- Fig. 3. Stamen.
- Fig. 4. Pistil.
- Fig. 5. Capsule.
- Fig. 6. Section of the capsule, showing the seeds.
- Fig. 7. A seed.



Gentiana Catesbaei

Armin & Smith Sc.

THE LATE

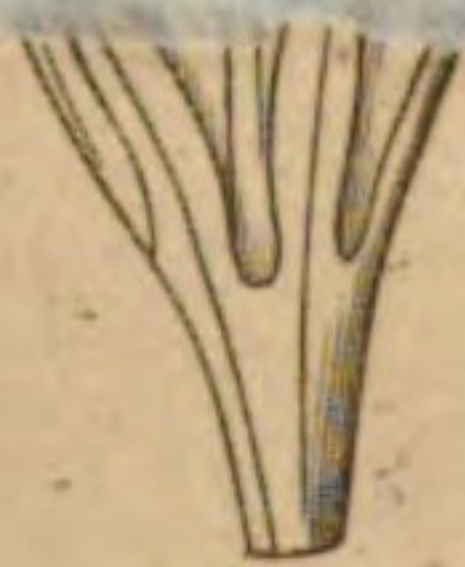
Mr. G. G. G.

PLATE 1

I am indebted to the Rev. Mr. G. G. G. of
Charleston S. C. for the specimens of the
above plant and for a quantity of the seeds in
preservation. Many of the present species of
Gentiana have a great degree of difference in the
size and among the several Gentiana which are
now imported from the States of the United States
some of the American species would bear
great resemblance in color and effect to the Euro-
pean plants. Indeed, I have ex-
amined specimens of some of the official root in
herbaries as the species which is the subject of
this article. This species was formerly con-
sidered with the Gentiana speciosa a fine au-
riferous compound of the Northern and Mid-

Gentiana speciosa





Gentiana Catesbaei

Arvin & Smith Sc.

GENTIANA CATESBÆI.

Blue Gentian.

=

PLATE XXXIV.

I am indebted to the late Dr. Macbride, of Charleston, S. C. for my specimens of this medicinal plant, and for a quantity of its root in preservation. Many of the perennial species of Gentian have a great degree of bitterness in the root, and among these the *Gentiana lutea*, or common imported Gentian of the shops, stands pre-eminent. Of the American species, several bear great resemblance in taste and effect to the European plant. No one, however, which I have examined approaches so near to the officinal root in bitterness, as the species which is the subject of this article. This species was formerly confounded with the *Gentiana saponaria*, a fine autumnal plant, common in the Northern and Mid-

dle states. It differs widely, however, from that species in the size of its leaves, the length of its calyx, the open mouth of its corolla and shape of its segments. An imperfect figure of this plant, published by Catesby sixty years ago, has been quoted by subsequent botanists as belonging to *G. Saponaria*. It has now been very properly distinguished by Walter and Elliott, who have applied to the new species the name of its earliest delineator.

The genus *Gentiana* has a *monopetalous corolla*; a *capsule one-celled and two-valved*, with *two longitudinal receptacles*. The species *Catesbæi* has a *rough stem*; *leaves ovate-lanceolate*; *segments of the calyx longer than the tube*; *mouth of the corolla open*, its *outer segments subacute*, *inner segments bifid and fimbriate*.

This genus is placed by Linnæus in his class and order *Pentandria, Digynia*. A part of the species, however, depart from the character of this class, and constitute one of those instances in which the general rules of the arrangement are violated, that apparently natural genera may not be divided. A part of the *Gentians* have five stamens and a five-cleft corolla; others have four stamens and a four-cleft corolla; others have a still different number. Yet so uniform is the

structure of the fruit, and so great the apparent affinity of the plants, that botanists have hitherto kept the genus entire, even though the variety of form as well as of number in the calyx, corolla, and stamens might perhaps justify a subdivision.

This genus belongs to the natural order *Rotaceæ* of Linnæus, and to Jussieu's *Gentianæ*.

The *Gentiana Catesbæi* has a branching and somewhat fleshy root. Stem simple, erect, rough. Leaves opposite, ovate or lanceolate, slightly three-nerved, acute, rough on the margin. Flowers crowded, nearly sessile, axillary and terminal. Segments of the calyx linear-lanceolate, varying in length, exceeding the tube and sometimes more than twice its length. Corolla large, blue, ventricose, plaited; its border ten-cleft, the five outer segments roundish and more or less acute, the five inner bifid and fimbriate. Stamens five, with dilated filaments and sagittate anthers. Germ oblong-lanceolate, compressed, supported by a sort of pedicel. Style none, stigmas two, oblong, reflexed. Capsule oblong, acuminate, one-celled, two-valved.

The dried root of this vegetable has at first a mucilaginous and sweetish taste, which is soon succeeded by an intense bitter, approaching nearly to that of the officinal gentian. This quality

appears to reside in a bitter extractive principle, soluble in both alcohol and water. A little resin is developed by the pearly appearance which the tincture assumes on the addition of water. The decoction, however, is nearly equal in bitterness to the tincture, and both these solutions exhibit this property much more powerfully than the root in substance. No astringency appears in this root, and nothing remarkable in the distilled water.

I have found the root of this plant in a variety of instances in which I have used it, to resemble very nearly the imported Gentian in its properties, being but little inferior to it in strength or efficacy. Like that substance it invigorates the stomach and gives relief in complaints arising from indigestion. Dr. Macbride, at whose suggestion I first employed it, entertained a high opinion of its tonic power in cases of debility of the stomach and digestive organs.

In Mr. Elliott's Botany of the Southern States, we are told, that in the form of a decoction it is used with decided advantage in cases of pneumonic, where the fever is nervous, and that it acts as a tonic and sudorific. A tincture of it is esteemed as a remedy in dyspepsia, given in doses of one fourth or half an ounce. It is said to increase

the appetite, prevent the acidification of the food, and to enable the stomach to bear and digest articles of diet, which before produced oppression and dejection of spirits.

BOTANICAL REFERENCES.

Gentiana Catesbæi, WALTER, *Flora Carol.* p. 109.—ELLIOTT, *Botany of the Southern States*, i. 340.

MEDICAL REFERENCE.

ELLIOTT, *loc. cit.*

PLATE XXXIV.

Fig. 1. *Gentiana Catesbæi*.

Fig. 2. A flower with the corolla drawn open to show the inner plicæ.

Fig. 3. Stamens and pistil in their natural situation.

Fig. 4. Stamens separate.

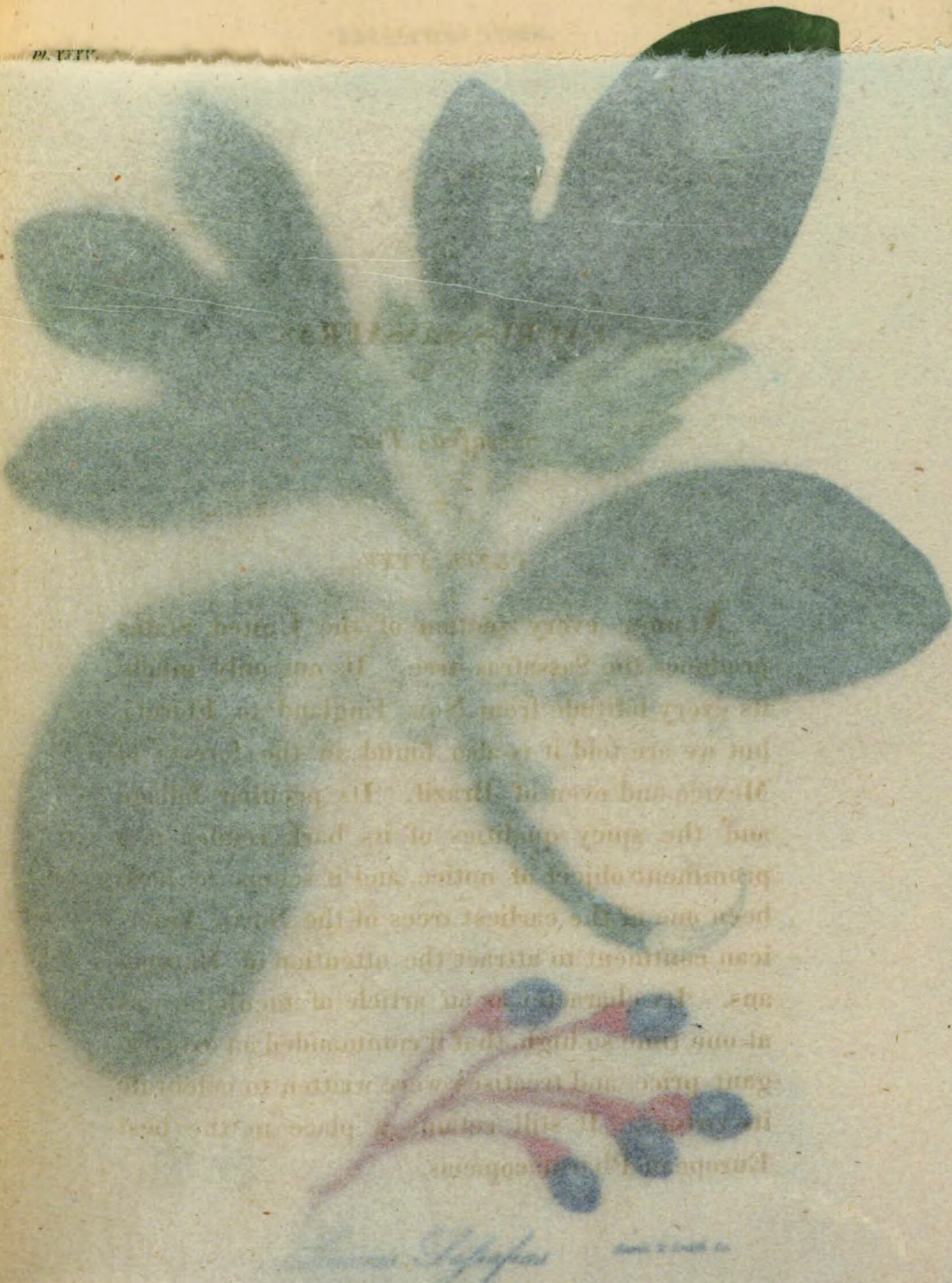
Fig. 5. Pistil.

LAURUS SASSAFRAS.

Sassafras Tree.

PLATE XXXV.

ALMOST every section of the United States produces the Sassafras tree. It not only inhabits every latitude from New England to Florida, but we are told it is also found in the forests of Mexico and even of Brazil. Its peculiar foliage and the spicy qualities of its bark render it a prominent object of notice, and it seems to have been one of the earliest trees of the North American continent to attract the attention of Europeans. Its character as an article of medicine was at one time so high, that it commanded an extravagant price, and treatises were written to celebrate its virtues. It still retains a place in the best European Pharmacopæias.



It was every season of the year that
the flowers were in bloom. It was only when
the leaves had fallen from the tree that
but we are told it is also found in the forests of
the Andes and even of Brazil. The perfume which
and the spicy qualities of its bark rendered it a
prominent object of notice and it is said to have
been one of the earliest uses of the bark of the
tree to attract the attention of the natives.
The plant is an article of commerce and
it is said to be used in the preparation of
giant pills and various other remedies to relieve
in various parts of the body. It is still found in the
forests of the tropics.

Passiflora ligularis L.

LAURUS SASSAPARILLA

Sassafras Linn.

Sassafras Linn.

Almost every section of the United States produces the *Sassafras* tree. It not only inhabits every latitude from New England to Florida, but we are said to find it even in the forests of Mexico and Asia. Its peculiar foliage and the quality of its bark render it a prominent object of notice, and it seems to have been one of the earliest trees of the North American continent to attract the attention of Europeans. Its character as an article of medicine was at one time so high, that it commanded an extravagant price, and treatises were written to celebrate its virtues. It still retains a place in the best European Pharmacopæias.



Laurus Sassafras

Austin & Smith Sc.

The genus of trees and shrubs known by the name of *Laurus* comprises many of the most useful as well as celebrated products of the vegetable world. The Bay tree or Laurel of the ancients, the Cinnamon tree, Cassia tree, Camphor tree, and Avocado pear, are either of them entitled to give notoriety to the genus to which they belong. This genus has a couple of from four to six divisions, according to the distaste glands, or counting: stamens tripartite in number. Fruit a drupe; flowers often polygamous. The species *Sassafras* is polygamous, with leaves entire and lobed.

The *Laurus* constitute one of the few genera assigned by Linnaeus to his class *Arborescentes*, to the first order of which they belong. Jussieu has placed them with his *Lauræ*, to which they give name. The propriety with which they have been associated with the *Linnaean* natural order *Umbellales* is of a very questionable nature.

The *Sassafras* tree of the United States, at times, in favourable situations, to a tall stature and large circumference. In the Northern States, it is of smaller size, yet trees are sometimes met with about Boston which attain to nearly the average height of the woods around them, and have trunks a foot in thickness. The bark of the

The genus of trees and shrubs known by the name of *Laurus* comprises many of the most useful as well as celebrated products of the vegetable world. The Bay tree or Laurel of the ancients, the Cinnamon tree, Cassia tree, Camphor tree, and Avocado pear, are either of them sufficient to give notoriety to the genus to which they belong. This genus has a *calyx* of from four to six divisions; *nectary* of three *bisetose* glands, or wanting; *stamens* variable in number; fruit a *drupe*; flowers often *polygamous*. The species *Sassafras* is *polygamous*, with leaves entire and lobed.

The Laurels constitute one of the few genera assigned by Linnæus to his class *Enneandria*, to the first order of which they belong. Jussieu has placed them with his *Lauri*, to which they give name. The propriety with which they have been associated with the Linnæan natural order *Oleraceæ* is of a very questionable nature.

The Sassafras tree, of the United State, arrives, in favourable situations, to a tall stature and large circumference. In the Northern States, it is of smaller size, yet trees are sometimes met with about Boston which attain to nearly the average height of the woods around them, and have trunks a foot in thickness. The bark of the

trunk is much cracked and of a greyish colour ; the young twigs are of a reddish green. The leaves are remarkable for the variety of their form on the same tree. Those which proceed first from the bud are usually oval and entire ; the next have the same form with a lobe on one side ; the last and most numerous have regularly three lobes. They grow on petioles, and are very downy when young, but become smoother by age. The flowers grow from the sides of the branches below the leaves, having the scales of the former bud for their floral leaves. They are disposed in short slender racemes of a pale green colour, each flower having six oblong segments. Different trees produce barren and perfect flowers. The barren flowers have nine stamens, six of which are exterior and three interior. The perfect flowers, the kind represented in our plate, have only six stamens, with short filaments and heart-shaped anthers. Nectary none. Germ roundish with a straight, erect style. Fruit an oval drupe of a deep blue colour, supported by a red incrassated pedicel. Only a small number of the trees produce fruit.

The bark of this tree has a fragrant smell and a very agreeable spicy taste. The flavour of the root is most powerful, that of the branches

more pleasant. The flavour and odour reside in a volatile oil which is readily obtained from the bark by distillation. It is of a light colour, becoming darker by age, very pungent, and heavier than water, so that it sinks in that fluid when the drops are sufficiently large to overcome the repulsion at the surface. The bark and pith of the young twigs abound with a pure and delicate mucilage. A very small quantity of the pith infused in a glass of water gives to the whole a ropy consistence, like the white of an egg. This mucilage has the uncommon quality that it is not precipitated, coagulated, or rendered turbid by alcohol. It continues in a perfectly transparent state when mixed with that fluid, though it does not unite with it. When evaporated to dryness, it leaves a light coloured, gum-like residuum.

The volatile oil and the mucilage appear to contain all the medicinal virtue of the tree.

The bark and wood of the Sassafras were formerly much celebrated in the cure of various complaints, particularly syphilis, rheumatism and dropsy. Its reputation, however, as a specific in those diseases, particularly the first, has fallen into deserved oblivion, while it is now recognized only with regard to its general properties, which are those of a warm stimulant and diaphoretic.

It is retained by the Dispensatories as an ingredient in several preparations, particularly the compound decoction of guaiacum, formerly called "decoction of the woods;" and the compound decoction of Sarsaparilla, formerly the "Lisbon diet drink." These preparations are useful as sudorifics in rheumatism, some cutaneous diseases, and the sequelæ of syphilis. They derive, however, more of their efficacy from their other ingredients, than from the Sassafras, a principal part of the efficacy of which is dissipated by boiling.

The most proper mode of employing the Sassafras is in the form of its volatile oil, which may be given in very small quantities as an antispasmodic, stimulant and sudorific. It is too acrid to be taken unmixed, and should therefore be dissolved in spirit and mixed with water or syrup.

The mucilage of the pith of this tree is peculiarly mild and lubricating, and has been used with much benefit in dysentery, and in catarrhal, as well as calculous affections. Some eminent surgeons have employed it as a lotion in the most inflammatory stages of ophthalmia, to which its softness renders it extremely well suited.

The wood of the Sassafras tree is of a light texture, but is said to be durable when exposed

to the weather. It has been thought capable of repelling insects by its odour, and on this account has been employed for trunks, bedsteads, &c. A property of this kind, however, is wrongly attributed to it, since the wood retains scarcely any odour after a few months drying.

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MEDICAL REFERENCES.

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PLATE XXXV.

Fig. 1. *Laurus Sassafra*, a branch with perfect flowers of the natural size.

Fig. 2. A stamen magnified.

Fig. 3. Pistil, ditto.

Fig. 4. Fruit.

APOCYNUM ANDROSÆMIFOLIUM.

Dog's Bane.

=

PLATE XXXVI.

THIS is a branching perennial plant, found from Canada to Carolina about the sides of fences and the borders of woods. It has a peculiarly neat aspect derived from its smoothness, its leafless and coloured stalk, bushy top and delicate flowers. Like the other American species, it is a lactescent plant, with a fibrous bark. It attains its flowering period in June and July.

The genus *Apocynum* has a *bell-shaped corolla*; a *nectary of five corpuscles surrounding the germ*; *anthers adhering to the stigma by the middle*; *follicles two*; *seeds with down*.

The present species is *glabrous, its stem erect and branching*; *cymes lateral and terminal*; *corolla spreading*.



Apocynum androsaemifolium

Andria & Smith Sc.

APOCYNUM ANDROSÆMIFOLIUM.

Dog's Bane.

=

PLATE XXXVI.

THIS is a branching perennial plant, found from Canada to Carolina about the sides of forests and the borders of woods. It has a peculiarly neat aspect derived from its smoothness, its leafless and coloured stalk, bushy top and delicate flowers. Like the other American species, it is a lactescent plant, with a fibrous bark. It enters its flowering period in June and July.

The genus *Apocynum* has a bell-shaped corolla; a nectary of five corpuscles surrounding the germ; anthers adhering to the stigma by the middle; follicles two; seeds with down.

The present species is glabrous, its stem erect and branching; cymes lateral and terminal, the corolla spreading.



Apocynum androsaemifolium

Annin & Smith Sc.

Class: *Fraxinacea*, order *Umbellales*, natural or-

der *Umbellales*, *Umbellales*, *Umbellales*.

The *Fraxinus* *Andromedifolia* grows often to the height of five or six feet, though its com- mon elevation is three or four. Its stalk is smooth, simple below, branching repeatedly at top, red on the side exposed to the sun. Leaves opposite, smooth on both sides, paler beneath, ovate, acute, on short petioles. The flowers grow in nodding cymes from the ends of the branches and axils of the upper leaves, furnished with im- mune acute bracts. Calyx five-lobed, acute, much shorter than the corolla. Corolla white tinged with red, monopetalous, campanulate, with five acute, spreading segments. Stamens five, with very short filaments, and connivent oblong arrow- shaped anthers, cohering with the stigma about their middle. The nectary consists of five ob- long glandular bodies alternating with the sta- mens. Gerns two, ovate, concealed by the an- thers. Stigma thick, roundish, agglutinated to the anthers. The fruit is a pair of slender linear- lanceolate follicles, containing numerous imbric- ated seeds each crowned with a long papus or down, and attached to a slender central recep-

acle.

Class *Pentandria*, order *Digynia*; natural orders *Contortæ*, Linnæus; *Apocineæ*, Jussieu.

The *Apocynum Androsæmifolium* grows often to the height of five or six feet, though its common elevation is three or four. Its stalk is smooth, simple below, branching repeatedly at top, red on the side exposed to the sun. Leaves opposite, smooth on both sides, paler beneath, ovate, acute, on short petioles. The flowers grow in nodding cymes from the ends of the branches and axils of the upper leaves, furnished with minute acute bractes. Calyx five-cleft, acute, much shorter than the corolla. Corolla white tinged with red, monopetalous, campanulate, with five acute, spreading segments. Stamens five, with very short filaments, and connivent, oblong arrow-shaped anthers, cohering with the stigma about their middle. The nectary consists of five oblong glandular bodies alternating with the stamens. Germs two, ovate, concealed by the anthers. Stigma thick, roundish, agglutinated to the anthers. The fruit is a pair of slender linear-lanceolate follicles, containing numerous imbricated seeds each crowned with a long pappus or down, and attached to a slender central receptacle.

Every part of the Apocynum when wounded emits copiously a milky juice. When chewed, the root communicates an unpleasant and intensely bitter taste. It exhibits, when dry, the following chemical phenomena.—If a solution in ether be mixed with alcohol, the alcohol, though not turbid at first, becomes so when the ether evaporates. An aqueous infusion or decoction is of a deep red colour and intensely bitter. A solution in alcohol is nearly destitute of colour, but retains the whole bitterness of the plant, and is not disturbed by the addition of water. When submitted to distillation a slight oily film floats on the surface of water in the receiver.—From these facts we may conclude that the Apocynum contains, 1. A bitter extractive principle. 2. A colouring principle soluble in water and not in alcohol. 3. Caoutchouc. 4. A volatile oil.

In various parts of the Eastern States this plant has been shewn to me by country practitioners under the name of *Ipecac*. This name is applied to it from its power of acting on the stomach in the same manner as the Brazilian emetic. Several physicians, among whom is Dr. Richardson of Medway, inform me that they have found about thirty grains of the root to evacuate the contents of the stomach as effectually as two

thirds the quantity of Ipecacuanha. In my own trials it has appeared to me much less powerful than the latter substance, and although it produces vomiting, yet this power is diminished by keeping, and appears to be eventually destroyed by age. When used for the purpose of an emetic, the recently powdered root should be employed.

The sensible and chemical qualities of this root seem to promise a good effect when given in small doses as a tonic medicine to the stomach. My observations on this subject may hereafter be more mature. (*See Appendix.*) We have certainly very few indigenous vegetables which exceed the Apocynum in bitterness. Perhaps its emetic property when given in large doses may be owing to this quality. Most bitter vegetables produce vomiting when administered in large quantities.

Kalm observes in his travels in North America, that in some parts of the country this plant was suspected of poisonous properties like those of the *Rhus vernix*. The country people informed him that the milky juice rubbed on the hands produced blistering in many persons, and that some were affected in the same way even by the effluvium of the plant.—I know of no other authority than that stated above for the existence of such a property in the Apocynum. The plant is

common and well known in Massachusetts, yet I have never heard it suspected of deleterious properties.

The flowers of the Apocynum have a power of catching flies and small insects which was ascribed by Dr. Darwin to an irritability in the internal organs. Mr. Curtis in the Botanical magazine, has considered this subject at large, and ascribes the property to a more rational cause. In consequence of the close convergency of the anthers and their adhesion to the stigma, a narrow fissure or slit exists, which becomes more contracted near the top. The insect in search of the honey at the bottom of the flower, inserts his proboscis between the stamens into the cavity within them. In extricating it from this situation the proboscis is sometimes caught in the fissure, and in proportion to the efforts made by the insect to escape it becomes more closely wedged in the upper part of the slit, so that its deliverance by its own powers becomes at length impracticable. Musquitoes, gnats, and small flies are frequently found dead in this confinement.

BOTANICAL REFERENCES.

Apocynum androsæmifolium, LIN. *Sp. pl.*—CURTIS, *Botanical Magazine*, t. 280.—DARWIN, *Botanic Garden*, ii. 182.—MICHAUX, *Flora*, i. 121.—PURSH, i. 179.

MEDICAL REFERENCE.

KALM, *Travels*, iii. 26.

PLATE XXXVI.

Fig. 1. Branch of *Apocynum androsæmifolium*.

Fig. 2. Pair of follicles.

Fig. 3. Cone formed of the united stamens.

Fig. 4. Stamen detached.

Fig. 5. Side view of the calyx, nectaries and germs.

Fig. 6. Front view of the same.

Fig. 7. A seed.

DIRCA PALUSTRIS.

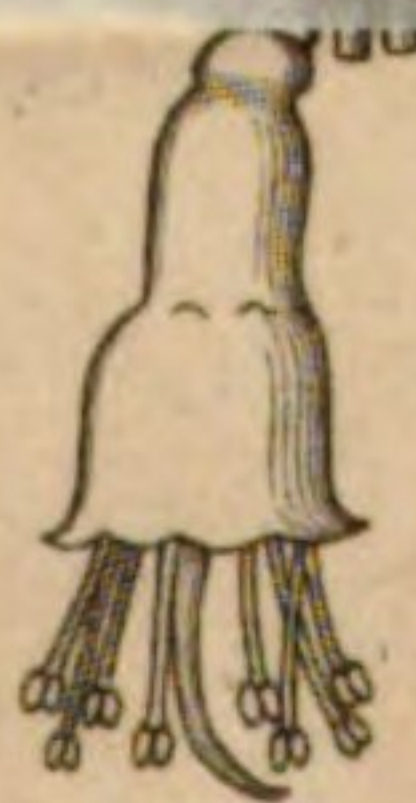
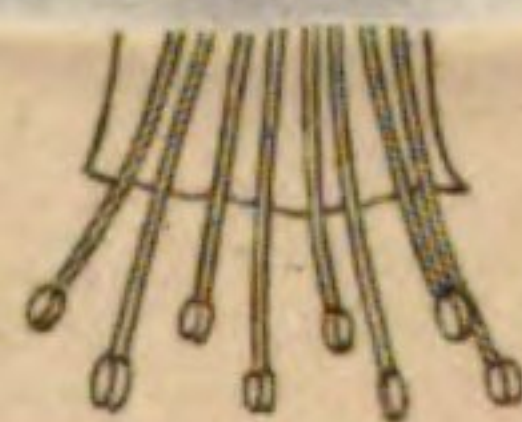
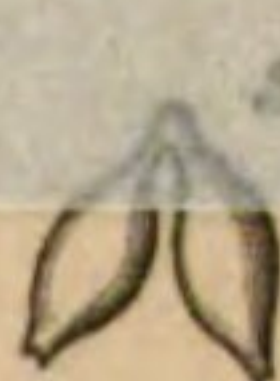
Leather Wood.

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PLATE XXXVII.

THE diversity of climate in different latitudes of the United States does not prevent this shrub from appearing in the most rigorously cold as well as in the warmest sections of the country. I have seen it growing plentifully on the banks of the Kennebec, in Maine, and Mr. Bartram found it in great vigour on the Savannah river in Georgia. It is a marshy shrub frequenting low woods and the vicinity of water, flowering in April and May. It is commonly of humble growth, though Mr. Bartram found specimens six or seven feet in height. It is remarkable for the flexibility of its wood and toughness of its bark, which are so great that it cannot be broken without great difficulty. The Aborigines employed





Dirca palustris

Annin & Smith Sc.

DIBCA PALUSTRIS.

Leather Wood.

PLATE XXXVII.

THE diversity of climate in different latitudes of the United States does not prevent this shrub from appearing in the most rigorously cold as well as in the warmest sections of the country. I have seen it growing plentifully on the banks of the Kennebec, in Maine, and Mr. Bartram found it in great vigour on the Savannah river in Georgia. It is a marshy shrub frequenting low woods and the vicinity of water, flowering in April and May. It is commonly of humble growth, though Mr. Bartram found specimens six or seven feet in height. It is remarkable for the flexibility of its wood and toughness of its bark, which are so great that it cannot be broken without great difficulty. The Aborigines employed



Dirca palustris

Annie & Smith Sc.

it for their colour, and from its great tenacity the name of Leather-wood has been applied to it in most parts of the United States. The Canadian French called it Bois de Peau or Peau de Vache from its flexibility.

The generic character of *Bacca* consists in a tubular corolla without calyx, but with its lobes absolutely toothed. Stamens longer than the corolla. Berry one-seeded.

The genus contains but a single species.

Class Dicotyledonous, order, Monogynia, Natural orders, Euphorbia, Fam. Thymelaeae, Juss.

The *Bacca* is an irregular shrub somewhat distinguished by the horizontal tendency of its branches and leaves. The branches have an interrupted or jointed mode of growth. The leaves are scattered or alternate, with very short petioles. They are oval, entire, subacute, hairy, when young, smooth and membranous when fully grown, and pale on the under side. The flowers appear long before the leaves. Previously to their emerging they exist in miniature within a small hairy bud, which occupies a sheath or calyx in the end of each flowering branch. They are commonly in bunches of three together with their peduncles coherent. Each flower is about half an inch long, of a yellow colour and without

it for their cordage, and from its great tenacity the name of *Leather wood* has been applied to it in most parts of the United States. The Canadian French called it *Bois de Plomb* or *Leaden wood* from its flexibility.

The generic character of *Dirca* consists in a *tubular corolla without calyx, having its border obsoletely toothed. Stamens longer than the corolla. Berry one-seeded.*

The genus contains but a single species.

Class *Octandria*, order *Monogynia*. Natural orders *Vepreculæ*, Lin. *Thymelææ*, Juss.

The *Dirca* is an irregular shrub somewhat distinguished by the horizontal tendency of its branches and leaves. The branches have an interrupted or jointed mode of growth. The leaves are scattered or alternate, with very short petioles. They are oval, entire, subacute, downy, when young, smooth and membranous when fully grown, and pale on the under side. The flowers appear long before the leaves. Previously to their emerging they exist in miniature within a small hairy bud, which occupies a sheath or cavity in the end of each flowering branch. They are commonly in bunches of three together with their peduncles cohering. Each flower is about half an inch long, of a yellow colour and without ca-

lyx. The corolla is funnel-shaped, with a contraction near the base and another in the middle, its border dilated, and slightly and irregularly toothed. Stamens eight, much longer than the corolla, the alternate ones longest, the filaments capillary and inserted into the tube; the anthers roundish. Germ ovate placed obliquely, the style appearing to issue from one side. The style is capillary, curved, and longer than the stamens. The fruit is a small oval, acute, red, one-seeded berry.

Chemically examined, the bark of this shrub discovers a slightly resinous character by the pearliness which its tincture assumes on admixture with water. The decoction is somewhat mucilaginous and deposits slight flocculi on the addition of alcohol. Iron and gelatin produce no evidence of tannin or gallic acid. The distilled water has an unpleasant odour, but is void of acrimony.

The bark of the Dirca has a peculiar and rather unpleasant taste. When swallowed, it leaves a sensation of acrimony in the fauces which continues for some time. If taken in the quantity of six or eight grains, it produces a sense of heat in the stomach and at length brings on

vomiting. This effect pretty certainly occurs if the bark be recent or freshly powdered.

A variety of observations on this shrub have been made by my pupil, Dr. John Locke, who first called my attention to the examination of its properties. He found on experiment that not only the distilled water, but the decoction also was void of acrimony, and that in the boiled bark this property was very much diminished, though still present. The watery extract had considerable bitterness, but scarcely any of the peculiar acrimony of the plant. Taken in doses of a drachm, it did not produce any very sensible effect. Alcohol without heat acquired but slight sensible properties from the bark. Nothing came over by distillation with alcohol, but the alcohol remaining in the retort had acquired the acrimony. The spirituous extract procured by evaporating this decoction was equal to one twenty fourth of the bark from which it was obtained. It contained the acrimony in a concentrated form, producing a more powerful effect on the fauces than the fresh bark. It was largely but not completely soluble in water.

Dr. Locke gave the freshly dried root to various patients in doses of from five to ten grains, which quantity in most instances proved powerfully

emetic, and sometimes cathartic. It was found to be deteriorated by keeping, and did not produce the same effects when very old. In consequence of some statements which have been made in regard to its vesicating properties, Dr. Locke applied portions of the bark moistened with vinegar to the skin of his arm. In twelve hours no effect was produced, in twenty four some redness and itching took place and in thirty a complete vesication followed.

The fruit of the Dirca has been suspected of narcotic properties. Dr. Perkins, of Hanover, N. H. has communicated the case of a child which had eaten these berries with effects like those produced by Stramonium, such as stupor, insensibility, and dilatation of the pupils. An emetic brought up the berries and the child gradually recovered. A medical student who took several of the berries found that they produced nausea and giddiness.

The medicinal action of the bark of the Dirca probably depends on its acrid constituents, which appear to be partly of a resinous and partly of a volatile nature. Its properties appear somewhat allied to those of Polygala senega, for which it might perhaps be substituted in small quantities. It is best given in substance, though on ac-

count of the tenacity of its fibres it is difficult of subdivision. After beating in a mortar it resembles fine lint more than powder. Its vesicating properties appear too feeble to promise much utility.

I have introduced the *Dirca* in this place, not so much because it has been yet applied to any medical purpose of great importance; but because it would be improper, in a work like the present, to pass over unnoticed a shrub of such decided activity.

BOTANICAL REFERENCES.

Dirca palustris, LIN. *Amœnitates academicae*, iii. t. I. 6. 7.—
DUHAMEL, *Arb.* vi. t. 212.—PURSH, i. 236.—MICHAX, i. 268.—
BARTRAM, *Travels*, 309.—KALM, *Travels*, ii. 148.

MEDICAL REFERENCE.

B. S. BARTON, *Coll.* 32.

PLATE XXXVII.

Fig. 1. *A branch with leaves of Dirca palustris.*

Fig. 2. *A branch in flower.*

Fig. 3. *Fruit.*

Fig. 4. *Germ and style much magnified.*

Fig. 5. *Magnified corolla, laid open.*

Fig. 6. *Flower magnified.*

RUBUS VILLOSUS.

Tall Blackberry.

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PLATE XXXVIII.

THE family of shrubs comprized under the term *Rubus*, including the various species of *Raspberry*, *Blackberry*, *Dewberry*, &c. is extensively diffused throughout the United States. Many of them are known as troublesome brambles, a few are unarmed, and a certain number are nearly herbaceous. Some are distinguished by the elegance of their flowers, and others by the deliciousness of their fruit. The *Rubus villosus* is one of the most common and interesting species. It abounds among the brushwood of neglected fields and pastures, about fences and the borders of woods, from the Eastern to the Southern states. Being of rapid growth, it is frequently troublesome to the farmer by spread-



Rubus villosus

Annis & Smith Sc.

RUBUS VILLOSUS.

Fall Blackberry.

PLATE XXVHL

The family of shrubs comprized under the name Rubus, including the various species of *Rubus*, Blackberry, Dewberry, &c. is extensively diffused throughout the United States. Many of them are known as troublesome brambles, & are so regarded, and a certain number are nearly indispensable. Some are distinguished by the elegance of their flowers, and others by the delicacy of their fruit. The *Rubus villosus* is one of the most common and interesting species. It abounds among the brushwood of neglected fields and pastures, about fences and the borders of woods, from the Eastern to the Southern states. Being of rapid growth, it is frequently troublesome to the farmer by spread-



Rubus villosus

Arnott & Smith Sc.

RUBUS VILLOSUS.

Tall Blackberry.

PLATE XXXVIII.

THE family of shrubs comprized under the term *Rubus*, including the various species of *Raspberry*, *Blackberry*, *Deeberry*, &c. is extensively diffused throughout the United States. Many of them are known as troublesome brambles, a few are unarmed, and a certain number are nearly herbaceous. Some are distinguished by the elegance of their flowers, and others by the deliciousness of their fruit. The *Rubus villosus* is one of the most common and interesting species. It abounds among the brushwood of neglected fields and pastures, about fences and the borders of woods, from the Eastern to the Southern states. Being of rapid growth, it is frequently troublesome to the farmer by spread.



Rubus villosus

Annis & Smith Sc.

ing in his hands, although it sells some animals
for the intrusion by the abundance and fine
flavour of its fruit. It is commonly called tall or
tall berry in distinction from the *R. trix*.
Its leaves are dark green, which it greatly resembles
in the quality of its fruit. It is in flower in June
and its fruit is ripe in August and September.

For the generic character, it has a five-lobed
calyx, five petals, and a compound berry com-
posed of one-seeded units. This species is pubes-
cent, prickly and prickly, the leaves in three or
fives, leaflets ovate, acuminate, serrate, pubescent,
with the petioles prickly. Flowers terminal.

Class *Ascanthia*, order *Polygonia*, natural or-
ders *Scitocosa*, *Lin. Wason*, *Wason*.

This shrub has a tall, branching, prickly
stem, which is more or less furrowed and angu-
lar. Leaves mostly in threes on a channelled,
prickly petiole. A few are solitary and some pri-
mary. Leaflets ovate, acuminate, sharply and un-
gually serrate, covered with scattered hairs above,
and with a thick soft pubescence underneath.
The terminal leaflet is pedicelled, the two side-
ones sessile. The petiole and back of the mid-
dle rib are commonly armed with short recurved
prickles. The flowers grow in erect racemes
with a long, prickly stalk. The pedicels are

ing in his lands, although it offers some amends for the intrusion by the abundance and fine flavour of its fruit. It is commonly called *tall* or *high* blackberry in distinction from the *R. trivialis* or *low* blackberry, which it greatly resembles in the quality of its fruit. It is in flower in June and its fruit is ripe in August and September.

For the generic character, it has a *five-cleft calyx*; *five petals*; and a *compound berry composed of one-seeded acini*.—This species is *pubescent, bristly and prickly, the leaves in threes or fives, leaflets ovate, acuminate, serrate, pubescent, with the petioles prickly; flowers racemed*.

Class *Icosandria*, order *Polygynia*; natural orders *Senticosæ*, Lin. *Rosaceæ*, Juss.

This shrub has a tall, branching, prickly stem, which is more or less furrowed and angular. Leaves mostly in threes on a channelled, hairy petiole. A few are solitary and some quinate. Leaflets ovate, acuminate, sharply and unequally serrate, covered with scattered hairs above, and with a thick soft pubescence underneath. The terminal leaflet is pedicelled, the two side ones sessile. The petiole and back of the middle rib are commonly armed with short recurved prickles. The flowers grow in erect racemes with a hairy, prickly stalk. The pedicels are

slender, an inch or two in length, covered with glandular hairs and supported by lanceolate bractes. Calyx divided into five ovate, concave, hairy segments ending in an acuminate point or a lanceolate leaflet. Petals five, white, ovate or oblong, concave, contracted into a short claw at base. Stamens very numerous, with roundish anthers and slender, white filaments. Germs numerous, covering a conic central receptacle. Styles capillary, arising from the sides of the germs, persistent. Fruit a black, shining, compound berry formed of pulpy acini attached to the receptacle, each containing a single oblong seed.

The bark of the root of this bramble is the part which has been medicinally employed. It is a pure and strong astringent, which property it manifests both by its sensible effects and by chemical examination. When treated with the sulphate of iron both the tincture and decoction assume a beautiful dark purple colour and throw down a copious precipitate. A precipitate also takes place on the addition of gelatin, which is copious, white and opaque. The alcoholic solution is in part decomposed by water. The substance precipitated does not occasion the uniform turbidness which usually attends the separation

of resins, but exhibits a flocculent appearance like that of conglutated mucilage. These flocculi, however, when collected and dried, exhibit the common resinous properties on exposure to heat. I subjected the dried bark to distillation, but the distilled water was nearly insipid, possessing only a very slight flavour of the root.

The properties of this bark are those of a very powerful astringent. I have tried its operation sufficiently to become satisfied of its efficacy both internally and externally used in a variety of cases which admit of relief from medicines of its class. It is true that our list of vegetable astringents has become very numerous and the cases which require them are perhaps less frequent than was formerly imagined; yet as we continue to import and consume various foreign medicines of this kind, we ought not to exclude from attention native articles of equal efficacy. Professor Chapman, of Philadelphia, expresses a very decided opinion in regard to the powers of this substance. "Of the vegetable astringents," says he, "this I have reason to believe is among the most active and decidedly efficacious in certain cases. To the declining stages of dysentery after the symptoms of active inflammation are removed, it is well suited, though I have given it, I think, with

greater advantage under nearly similar circumstances, in cholera infantum. To check the inordinate evacuations which commonly attend the protracted cases of this disease, no remedy has ever done so much in my hands. Even two or three doses will sometimes so bind the bowels that purgatives became necessary. Being so powerfully astringent, this medicine is useful in all excessive purgings, and especially in the diarrhea of very old people, as well as when it occurs at the close of diseases. During my attendance in our public institutions I had abundant opportunities of testing its efficacy in these cases."

The fruit of the blackberry is among the most delicious productions of the uncultivated forest. To an agreeable combination of sweetness and acid it adds an aromatic fragrance which is surpassed by few of the lighter fruits produced among us. It differs in size and perfection in different seasons, warm and dry summers being most favourable to its perfect maturity. Our markets, however, are rarely destitute of this fine fruit in the months of August and September.

Some other species of *Rubus* are closely allied to this in the qualities of their fruit and bark, particularly the *Rubus procumbens*, commonly called *low* or *running* blackberry or dewberry.

The fruit of this species is usually larger but produced in smaller quantity from the inflorescence being nearly solitary. The bark is not less astringent than in the present species.

BOTANICAL REFERENCES.

Rubus villosus, AITON, *Kew*, ii. 210.—WILLDENOW, ii. 1085.
—MICHaux, i. 297.—PURSH, i. 346.

MEDICAL REFERENCES.

CHAPMAN, *Therapeutics and Mat. Med.* ii. 474.—THACHER, *Disp.* 341.

PLATE XXXVIII.

Fig. 1. *A specimen of Rubus villosus in flower.*

Fig. 2. *Stamen.*

Fig. 3. *Pistils.*

Fig. 4. *The ripe fruit.*

CASSIA MARILANDICA.

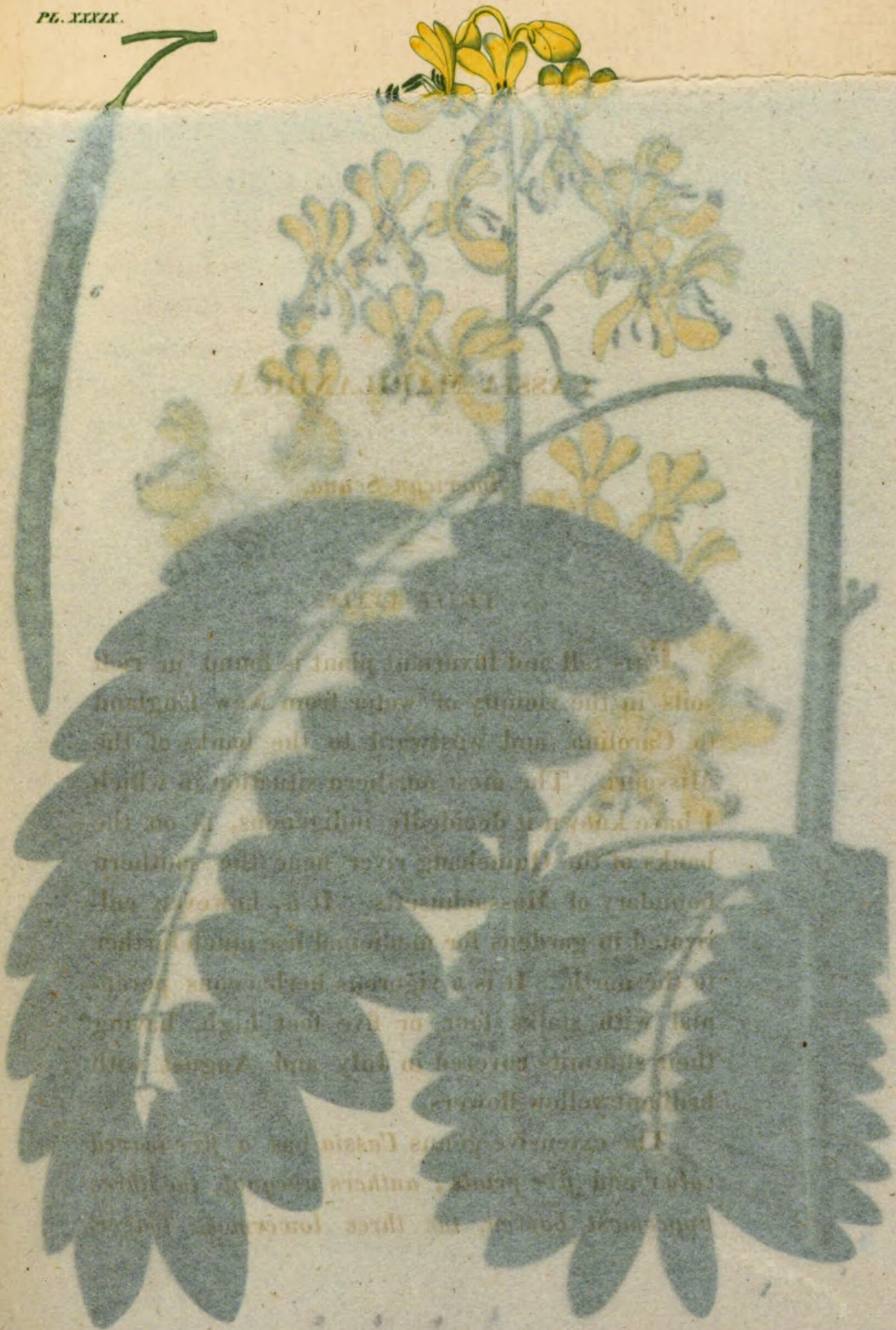
American Senna.

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PLATE XXXIX.

THIS tall and luxuriant plant is found in rich soils in the vicinity of water from New England to Carolina, and westward to the banks of the Missouri. The most northern situation in which I have known it decidedly indigenous, is on the banks of the Quinebaug river near the southern boundary of Massachusetts. It is, however, cultivated in gardens for medicinal use much further to the north. It is a vigorous herbaceous perennial with stalks four or five feet high, having their summits covered in July and August with brilliant yellow flowers.

The extensive genus *Cassia* has a *five-leaved calyx* and *five petals*; *anthers unequal*, the *three uppermost barren*, the *three lowermost longer*,



Cassia Marylandica

Annin & Smith Sc.

CASSIA MARILANDICA.

American Senna.

This tall and luxuriant plant is found in rich soils in the vicinity of water from New England to Carolina, and westward to the banks of the Missouri. The most northern situation in which I have known it decidedly indigenous, is on the banks of the St. Lawrence river near the southern boundary of Massachusetts. It is, however, cultivated in gardens for medicinal use much farther to the north. It is a vigorous herbaceous perennial with stalks four or five feet high, having their summits covered in July and August with brilliant yellow flowers.

The extensive genus *Cassia* has a five-leaved calyx and five petals; anthers unequal, the three uppermost barren, the three lowermost longer.



Cassia Marilandica

Annin & Smith Sc.

curved and beaked. Legumes two-valved. — The species *Maritima* has eight or nine pairs of leaflets which are oblong-lanceolate, and mucronate; an oblong gland on the petiole. Leaves axillary and terminal; legumes linear and curved.

Class *Hamamelidaceae*, order *Monogynae*, Natural

order *Hamamelidaceae*, Linn. *Leguminosae*, Luss.

The stems, which grow in bunches and often attain the height of five or six feet, are round, striated, and intersected with a few scattered hairs. Petioles compressed, channelled above, bearing from eight to ten pairs of leaflets which are oblong, smooth, somewhat hairy at the edges, pale on the under side, supported by short crooked pedicels, and terminated with a rigid bristle at the end. On the base of the petiole is a large, white pedicelled gland, of a shining green, ter- minating in a dark point at top, which is some- times double. Each petiole is also furnished with a pair of linear-subulate, ciliate, deciduous stip- ules. The flowers grow in axillary racemes ex- tending from the top of the stem. The pe- dicels are slightly furrowed, pedicels supported by bristles like the stipules, and marked with mi- nute, blackish, glandular hairs. Leaves of the color yellow, oval, obtuse, the lateral ones longest. Petals five, bright yellow, spatulate, concave, very

curved and beaked. Legume two-valved.—The species *Marilandica* has *eight or nine pairs of leaflets, which are oblong-lanceolate, and mucronate; an obovate gland on the petiole. Racemes axillary and terminal; legumes linear and curved.*

Class *Decandria*, order *Monogynia*. Natural orders *Lomentaceæ*, Linn. *Leguminosæ*, Juss.

The stems, which grow in bunches and often attain the height of five or six feet, are round, striated, and invested with a few scattered hairs. Petioles compressed, channelled above, bearing from eight to ten pairs of leaflets, which are oblong, smooth, somewhat hairy at the edges, pale on the under side, supported by short crooked pedicels, and mucronated with a rigid bristle at the end. On the base of the petiole is a large ovate pedicelled gland, of a shining green, terminating in a dark point at top, which is sometimes double. Each petiole is also furnished with a pair of linear-subulate, ciliate, deciduous stipules. The flowers grow in axillary racemes, extending quite to the top of the stem. The peduncles are slightly furrowed, pedicels supported by bractes like the stipules, and marked with minute, blackish, glandular hairs. Leaves of the calyx yellow oval, obtuse, the lateral ones longest. Petals five, bright yellow, spatulate, concave, very

obtuse, three ascending and two descending. Stamens ten with yellow filaments and brown anthers. The three upper have short abortive anthers. To these succeed two pairs of deflexed linear anthers. The remaining three, or lowermost, are much longer, crooked, and taper into a sort of beak, the middle one being shortest. The anthers open by a terminal pore. Germ descending with the lower stamens, hairy; style ascending, stigma hairy, moist. The fruit consists of long legumes which are pendulous linear, curved, swelling at the seeds, and furnished with slight hairs.

The predominant constituents of the leaves in this plant appear to be resin extractive, and a volatile matter. The tincture is of a dark brown colour and is rendered extremely turbid by water. The infusion and decoction have a lighter colour and the peculiar taste of the plant. The distilled water is nauseous. It is found that both the infusion and decoction answer for medicinal use, yet it is probable that the tincture would be more strongly operative, did not the sedative effects of the alcohol prove a balance for the additional parts of the medicine dissolved.

The Cassia Marilandica is related to the oriental *Senna* in its botanical habit, and nearly re-

sembles it in its medicinal virtues.* Neither of these plants is to be ranked among the most active cathartics, and they require to be taken in much larger quantities than aloes, rhubarb or

* There is no doubt that the true Alexandrian Senna is the product of the *Cassia Senna* of Linnæus and of Willdenow. Lamarck has occasioned an unnecessary confusion on this subject, and misled other botanists, by changing the Linnæan name *C. senna* to *C. lanceolata*; while he has appropriated the name *C. senna* to the variety β of Linnæus, which is the Italian senna, since very properly named *C. Italica*. See Rees' Cyclopediæ, Art. Cassia, &c. The African plant is accounted the most active, although the Italian Senna cultivated in Jamaica, according to Dr. Wright, proved fully equal to it in efficacy.

The greater part of the Senna consumed in the United States is imported from the East Indies. Smaller quantities occasionally reach us from different ports of the Mediterranean and Red seas. The common India senna has a lanceolate leaf narrow and acute; petioles without glands, bearing from five to nine pairs of leaves; and a flat oblong curved legume. Medicinally considered, it is one of the most valuable sorts, operating with mildness and certainty. The facility and cheapness with which it is obtained in India, has long caused it to predominate in our markets.

The India senna, which I have examined, has been very pure, consisting only of leaves of Cassia. The Egyptian has frequently a slight admixture of foreign leaves which are nauseous and bitter.

The Cassia senna would doubtless succeed in our Southern states. The product, consisting of the whole leaves of the plant, must necessarily be large, and would well reward the attention of planters. Ripe seeds may probably be found among the senna of the shops which will vegetate, if not too old. According to Roxburgh and Carey, the Arabian senna cultivated at the Bengal garden is a biennial plant.

jalap, to produce their desired effect. Hence the common form of administering senna is in infusion, a large portion being made to communicate its strength to water at a time. As far as I have been able to observe, about one third more of the *Cassia marilandica* is required to produce a given effect, than of the *C. senna*. This objection will prevent it from superseding the senna of the shops, although the facility, with which it may be raised in any part of the United States, will render it a convenient medicine where cheapness is an object. It is already cultivated in gardens for medicinal use, and the infusion and decoction are considerably employed by families and country practitioners.

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PLATE XXXIX.

Fig. 1. *Cassia Marilandica*.

Fig. 2. *The three upper stamens*.

Fig. 3. *The fourth and fifth ditto*.

Fig. 4. *The sixth and seventh ditto*.

Fig. 5. *The three lowest ditto*.

Fig. 6. *A legume*.

Japan, to produce their desired effect. Hence the common form of administering seems to be in infusion, a large portion being made to contain one ounce of strength to water at a time. As far as I have been able to observe, about one third more of the Cassia marilandica is required to produce a given effect than of the C. senaria. This objection will prevent it from superseding the senaria of the shops, although the facility with which it may be raised in any part of the United States will render it a convenient medicine where cheapness is an object. It is already cultivated in gardens for medicinal use, and the infusion and decoction are considerably employed by families and country practitioners.

BOTANICAL REFERENCES.

Cassia Marilandica Lin. Sp. Pl. Martyn. Bot. 3. 28.
 Michx. Fl. 1. 201. Ternstr. 2. 286. Jussieu 4. 286.
 Cassia minima John. de. Benth. 1. 200. A. 330.

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B. S. Linn. Col. 32. Ternstr. Bot. 2. 286.
 Mac. Jussieu.

PLATE XXXIX.

- Fig. 1. Cassia Marilandica.
- Fig. 2. The three upper segments.
- Fig. 3. The fourth and fifth ditto.
- Fig. 4. The sixth and seventh ditto.
- Fig. 5. The three lower ditto.
- Fig. 6. A branch.

PL. XL.



Nicotiana glauca

Annis & Smith Sc.

AMERICAN TABACUM.

Tabacco.

CHINA.

At the time of the discovery of America the tobacco plant was cultivated by the natives in the West Indian Islands and in different parts of the continent, especially those lying on the Gulf of Mexico. When Columbus first discovered this plant he used it for smoking, but he did not know its medicinal properties, and it was not till a few years after that it was introduced into the Southern part of the United States. It is now present enlarged and improved, and is an annual plant capable of producing great quantities of fruit in almost any part of the Union, but seldom found growing spontaneously in nature, in cultivated grounds or in the mountains.



Nicotiana glauca

Drawn by J. Smith 1811

NICOTIANA TABACUM.

Tobacco.

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PLATE XL.

AT the time of the discovery of America the Tobacco plant was cultivated by the natives in the West India islands and in different parts of the continent, especially those bordering on the Gulf of Mexico. Whatever may have been its native climate, we need not trace it farther back than this period; and can incur but little risk in considering it as indigenous to the southern parts of the United States in their present enlarged extent. [*Note B.*] It is an annual plant capable of perfecting its flowers and fruit in almost any part of the Union, yet seldom found growing spontaneously except in cultivated grounds or their vicinity.

The genus *Nicotiana* has a funnel-shaped corolla, with its border somewhat plaited. Stamens inclined; stigma emarginate. Capsule two-celled, two or four-valved. The species *Tabacum*, represented in our plate, has its leaves ovate-lanceolate, sessile, decurrent; flowers paniced, acute.

Class *Pentandria*, order *Monogynia*. Natural orders *Luridæ*, Linn. *Solanaceæ*, Juss.

The common Tobacco has a long fibrous root; a stalk five or six feet high, erect, round, hairy, and viscid, branching at top. Leaves sessile, very large, ovate or lanceolate, acuminate, viscid, of a pale green colour. Bractes linear, acute. Flowers forming a panicle on the ends of the stem and branches. Calyx swelling, hairy, glutinous, half as long as the corolla, ending in five acute segments. Corolla funnel-shaped, swelling toward the top, the border expanding, with five acute lobes; the tube of a greenish white, the border red. Filaments inclined to one side, with oblong anthers. Germ ovate, style long and slender, stigma cloven. Capsule ovate, invested with the calyx, two-celled, two-valved, but opening cross-wise at top; partition contrary to the valves. Seeds very numerous, small, somewhat reniform, attached to a fleshy receptacle.

It is a remarkable law of the animal economy, that the power of use and habit is capable of reconciling the system to bear with impunity what in its unaccustomed state proves highly deleterious and even fatal. It is a fact that most substances in the *Materia Medica* lose their effect after the continuance of their use for a certain length of time, so that if we would realize their original operation, we must increase their dose in proportion as the body becomes accustomed and insensible to their stimulus. This is particularly exemplified in the narcotics. Many of these substances, which at first are not only nauseous and disgusting in their sensible qualities, but highly injurious in their influence upon health; are so changed in their effect by habitual use, as to become to those who employ them an innocent and indispensable comfort and a first rate luxury of life.

In its external and sensible properties, there is no plant which has less to recommend it than the common Tobacco. Its taste in the green state is acrid, nauseous and repulsive, and a small quantity taken into the stomach excites violent vomiting, attended with other alarming symptoms. Yet the first person who had courage and patience enough to persevere in its use, until hab-

it had overcome his original disgust, eventually found in it a pleasing sedative, a soother of care, and a material addition to the pleasures of life. Its use, which originated among savages, has spread into every civilized country; it has made its way against the declamations of the learned, and the prohibitions of civil and religious authority, and it now gives rise to an extensive branch of agriculture, or of commerce, in every part of the globe.

Tobacco was in use among the aborigines of America, at the time of its discovery. They employed it as incense in their sacrificial fires, believing that the odour of it was grateful to their gods. The priests of some tribes swallowed the smoke of this plant to excite in them a spirit of divination, and this they did to a degree which threw them into a stupor of many hours continuance. When recovered from this fit of intoxication, they asserted that they had held a conference with the devil, and had learned from him the course of future events. Their physicians also got inebriated with this smoke, and pretended that while under the influence of this intoxication they were admitted to the council of the gods, who revealed to them the event of diseases. *Harriot.*

In 1559 Tobacco was sent into Spain and Portugal by Hernandez de Toledo, and from thence it was carried into France as a curiosity by Jean Nicot or Nicotius, ambassador at the court of Lisbon, whose name is now immortalized by its application to this genus of plants. From this period the use of tobacco spread rapidly through the continent, and in half a century it was known in most countries in Europe. The rich indulged in it, as a luxury of the highest kind; and the poor gave themselves up to it, as a solace for the miseries of life. Its use became so general and so excessive, that in many countries, the constituted authorities, both of church and state, found it necessary to interpose, and to stop the extravagant indulgence in it by the severest prohibitions. James the First of England, besides writing a book against it, called his "Counterblast to Tobacco," gave orders that no planter in Virginia should cultivate more than one hundred pounds. Pope Urban the Eighth published a decree of excommunication against all who took snuff in the church. Smoking was forbidden in Russia under penalty of having the nose cut off. In Switzerland a tribunal (*Chambre du tabac*) was instituted for the express purpose of trying transgressors in Tobacco. A Turk, who was found

smoking in Constantinople, was conducted through the streets of that city with his pipe transfixed through his nose.

Even in this country, where the use of Tobacco originated, we find our puritanic ancestors guarding against its abuse by salutary statutes. In the old Massachusetts colony laws is an act laying a penalty upon any one "who shall smoke tobacco within twenty poles of any house;" or who shall "take tobacco in any inn or common victualling house, except in a private room, so as that neither the master of the said house nor any other guest shall take offence thereat."—In the earliest records of Harvard University soon after its foundation, is a regulation of this kind. "No scholar shall take tobacco, unless permitted by the president, with the consent of their parents and guardians, and on good reason first given by a physician, and then in a sober and private manner."

While the legal authorities in various parts of the world took upon them to control the abuse of this fascinating weed, the literati of different countries entered warmly into the discussion of its merits and its faults. Among its advocates were Castor Duranti and Raphael Thorius, both of whom wrote Latin poems expressly in its praise.

The performance of the latter is entitled a "Hymn to Tobacco," and is very lavish in ascriptions to this plant, which he styles the "gift of heaven and the ornament of earth." So warm were the prejudices of its advocates, that it obtained the reputation of a general panacea, and the catalogue of diseases which it was announced to cure, amounted almost to a complete nosology.

But the opinions of its adversaries were not less extravagant upon the other extreme. It is remarkable that in the days of its first general introduction, no man spoke about it with coolness or indifference, but every one warmly espoused its censure or its praise. Camden, in his life of Queen Elizabeth, says, that men used Tobacco every where, some for wantonness and some for health's sake; and that "with insatiable desire and greediness, they sucked the stinking smoke thereof through an earthen pipe, which they presently blew out again at their nostrils;—so that Englishmen's bodies were so delighted with this plant, that they seemed as it were degenerated into barbarians."

Dr. Venner in a work entitled *Via recta ad vitam longam*, published at London in 1638, gives a brief summary of the injuries done by Tobacco. "It drieth the brain, dimmeth the sight, vitiateth

the smell, hurteth the stomach, destroyeth the concoction, disturbeth the humours and spirits, corrupteth the breath, induceth a trembling of the limbs, exsiccates the wind pipe, lungs and liver, annoyeth the milt, scorcheth the heart and causeth the blood to be adusted. In a word, it overthroweth the spirits, perverteth the understanding, and confoundeth the senses with sudden astonishment and stupiditie of the whole body."

A poetical phillippic, called "Tobacco battered," was published in the reign of King James by Joshua Sylvester, in which he compares Tobacco to gunpowder, and pipes to guns; making the mischief of the two equal. But the most celebrated of all invectives against Tobacco was the "Counterblast" of King James I. That weak monarch gave vent to his prejudices against this herb in a publication, in which he professes to disprove all the alleged grounds for the toleration of Tobacco, and warns his subjects in a most earnest manner not to sin against God, and harm their own persons and goods, and render themselves scorned and contemned by strangers, who should come among them; by persevering in a custom loathsome to the eye, hateful to the nose, and baneful to the brain."

Such were the commotions excited by the introduction and spreading of an article, whose use has now become so common as scarcely to attract notice. This article is the product of several species of *Nicotiana*, but chiefly of the *N. tabacum* or Virginian Tobacco, and the *N. rustica*, sometimes called English Tobacco, and being the sort which Sir Walter Raleigh introduced at the court of Queen Elizabeth. Another species, *N. fruticosa*, is said to have been cultivated in the East prior to the discovery of America. The Indians on the banks of the Missouri and Columbia rivers cultivate for use the *N. quadrivalvis* of Pursh and Nuttall. It has been remarked that the Tobacco of warm climates is more mild in its flavour, while that raised in colder latitudes is more strong and pungent. The Bengal Tobacco, of which the sheroots are made, is one of the most weak and mild in its properties. After this is the West India Tobacco which affords the Havana cigars. Next is the Tobacco of our Southern States, and lastly the Tobacco raised in the northern parts of the Union, which is the most acrimonious and pungent of all.*

* Several varieties of *Nicotiana Tabacum* are cultivated in the United States, of which the principal are the *broad leaved* or *sweet scented*, and the *narrow leaved*.

An elaborate chemical analysis of Tobacco, has been published by M. Vauquelin in the *Annales de Chimie*. His results are, that the broad leaved Tobacco furnishes from its juices the following constituents. 1. A large quantity of animal matter of an albuminous nature. 2. Malate of lime with an excess of acid. 3. Acetic acid. 4. Nitrate and muriate of potash in observable quantities. 5. A red matter soluble in alcohol and water, which swells and boils in the fire, its nature undetermined. 6. Muriate of ammonia. 7. A peculiar acrid, volatile, colourless substance, soluble in water and alcohol, and which appears different from any thing known in the vegetable kingdom. It is this principle which gives to prepared Tobacco its peculiar character, and it is perhaps not to be found in any other species of plant. The medicinal activity of Tobacco evidently resides in this volatile portion, for both the extract and decoction of the plant by long boiling become nearly inert, while the essential or the empyreumatic oil is one of the most deadly poisons known.

Among the substances used by Mr. Brodie in his experiments on vegetable poisons, was the empyreumatic oil of Tobacco prepared by Mr. Brande by distilling the leaves of Tobacco in a

heat above that of boiling water. A quantity of watery fluid came over, on the surface of which was a film of unctuous substance, which he calls the empyreumatic oil. Mr. Brodie found that two drops of this oil applied to the tongue of a young cat with an interval of fifteen minutes occasioned death. A single drop suspended in an ounce of water and injected into the rectum of a cat, produced death in about five minutes. One drop suspended in an ounce and a half of mucilage and thrown into the rectum of a dog, produced violent symptoms, and a repetition of the experiment killed him.

Tobacco has been used both as a luxury and prophylactic, and as a medicine. In the former cases it has not been taken internally, but only kept in contact with absorbing surfaces. It is well known, that to the mouth it is applied in substance and in smoke; and to the nose in the form of powder. The opinion which at one time prevailed of its power to prolong life and to secure immunity from diseases is now pretty fully abandoned. It has no prophylactic reputation except as a preservation for the teeth, and in some degree as a protection against the contagion of epidemics. In both these cases it is entitled to a certain degree of confidence, though

it is probably inferior to many other substances for both these purposes.

As to its effects upon longevity, the great frequency of its use and the facts and observations of Sir John Sinclair render it improbable that when moderately taken, it has any influence in wearing out the constitution, or abridging the usual period of life. But like all other narcotics its excessive use or abuse must impair the health and engender disease. Of the different modes of using Tobacco, I imagine that smoking is the most injurious, and the most capable of abuse, since in this process the active principles of the Tobacco are volatilized with the smoke, and are extensively applied to the lungs as well as the mouth and nose and fauces.

As a medicine, this plant has been employed in a variety of ways for the alleviation and cure of diseases. Externally it has been applied with benefit in tinea capitis and in complaints occasioned by the presence of insects. In the form of a cataplasm applied to the pit of the stomach it occasions severe vomiting. The prostration of strength and other distressing symptoms which attend this application, must prevent its general employment. Still it may be remembered as an auxiliary in cases where other emetics have failed

to operate. A surgeon in the U. S. army informed me that the soldiers had an expedient to exempt themselves from duty, by wearing a piece of tobacco under each armpit, until the most alarming symptoms of real illness appeared in the whole system.

Dr. James Currie has recorded a case of epilepsy cured by the external use of Tobacco. A cataplasm was applied to the stomach for several days about half an hour before the expected return of the paroxysm. A violent impression was produced each time upon the system, the paroxysm prevented and the diseased association effectually broken up. Two cases of obstinate and dangerous intermittent were cured in the same manner by a decoction of half a drachm of Tobacco in four ounces of water, thrown up as an enema, a short period before the time of the paroxysm.

The Tobacco enema was formerly recommended in colic, nephritic complaints, &c. Of late years it has been extensively employed in strangulated hernia. In cases of this complaint where the taxis has been ineffectually attempted and the usual auxiliaries have failed, an injection made by infusing half a drachm of Tobacco in eight ounces of boiling water for ten minutes, is

found extremely useful. If assisted by the local application of ice to the part, it frequently causes the contents of the sac to return spontaneously, and renders the operation unnecessary, which would be otherwise unavoidable. It operates by its powerfully sedative and relaxing effects, as well as by its cathartic property.

When the infusion is not used, an injection of Tobacco smoke into the rectum frequently produces the same consequences. The smoke may be made to penetrate farther than any liquid, and it is equally efficacious, from the activity of the volatile parts. It was formerly much used in the restoration of persons apparently dead from drowning, but of late years it has gone more into disuse. From the sedative effect of Tobacco, the tendency to syncope and the great prostration of strength which it occasions in ordinary cases; it is probable that its employment in cases of asphyxia from drowning, must assist in extinguishing rather than in rekindling the spark of life.

As a diuretic, Tobacco has been administered internally in doses so small as not to offend the stomach, with very good effect. Dr. Fowler has published a collection of facts relative to its use, principally in dropsy and dysury, from which he

concludes it is a safe and efficacious diuretic. In thirty one dropsical cases in which he employed it, eighteen were cured and ten relieved; and out of eighteen cases of dysury, ten were cured and seven relieved. Dr. Ferriar and several subsequent practitioners have found it a valuable diuretic, although Cullen does not speak very encouragingly of its use. At the present day it does not seem to be extensively in use, having passed into neglect rather because more fashionable remedies have superceded it, than because it has really been weighed and found wanting. It will always deserve trial in obstinate dropsical cases (and such cases it must be confessed are not rare) in which the more common remedies have been tried without benefit. Of the various formulas recommended by Dr. Fowler, the Wine of Tobacco is the only one preserved in the Edinburgh and Massachusetts pharmacopœias, being the one which is believed to extract most fully the virtues of the Tobacco. It is made by digesting for a week, an ounce of the dried Tobacco in a pound of Spanish white wine. The dose is from thirty to eighty drops. Dr. Fowler himself however believed the most effectual mode of administering the Tobacco, was in the form of pills of a grain each.

Tobacco has been employed with some success in the *locked jaw*, both of warm and cold climates. Mr. Duncan, surgeon of Grenada, has published in the *Edinburgh Journal* the account of a very distressing case of this kind, which was relieved and finally cured principally by enemata of Tobacco smoke. These applications generally produced syncope and deathlike sickness in the patient, but by prudent management of them, the disease was entirely overcome, and recovery took place. Dr. Holmes of Worcester county, Mass. exhibited the infusion of Tobacco, to a patient under violent tetanus, after the more common remedies had been fully tried without effect. The spasms were completely removed and the patient recovered.

This powerful medicine has been also employed with some palliative effect in hydrophobia and certain other spasmodic diseases. Its internal use however requires great caution, since patients have in various instances been destroyed by improper quantities administered by the hands of the unskilful or unwary. Notwithstanding the common use and extensive consumption of Tobacco in its various forms, it must unquestionably be ranked among narcotic poisons of the most active class. The great prostration of

strength, excessive giddiness, fainting, and violent affections of the alimentary canal, which often attend its internal use, make it proper that so potent a drug should be resorted to by medical men, only in restricted doses and on occasions of magnitude.

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PLATE XL.

Fig. 1. *Nicotiana tabacum*.

Fig. 2. Capsule.

Fig. 3. Ripe capsule opening at top.

Fig. 4. Transverse section.

NOTES.

Note A.

A memoir on the cultivation and use of *Asclepias Syraica*, by J. A. Moller, may be found in Tilloch's Philosophical Magazine, Vol. viii. p. 149. Its chief uses were for beds, cloth, hats and paper. It was found that from eight to nine pounds of the silk occupied a space of from five to six cubic feet, and were sufficient for a bed, coverlet and two pillows.—The shortness of the fibre prevented it from being spun and woven alone. It however was mixed with flax, wool, &c. in certain stuffs to advantage. Hats made with it were very light and soft. The stalks afforded paper in every respect resembling that obtained from rags. The plant is easily propagated by seeds or slips. A plantation containing thirty thousand plants yielded from six hundred to eight hundred pounds of silk.

Note B.

Tobacco was discovered in Cuba, Florida and Mexico, nearly three centuries ago, and was soon after introduced from this continent into Europe. Whether or not any species of it was cultivated in the East before the discovery of America, is a point of no consequence in regard to its American nativity. The extent of country throughout which it was used by the aborigines of this continent, renders it probable that it must have been cultivated in various parts of America for many centuries previous to its discovery.

The following account of the present mode of cultivating Tobacco in our Southern States is extracted from *An Historical and Practical Essay on the Culture and Commerce of Tobacco.* By William Tatham. London, 1800.

First, of preparing the Tobacco Ground.

“There are two distinct and separate methods of preparing the Tobacco ground: the one is applicable to the preparation of new and uncultivated lands, such as are in a state of nature, and require to be cleared of the heavy timber and other productions with which Providence has stocked them; and the other method is designed to meliorate and revive lands of good foundation, which have been heretofore cultivated, and, in some measure, exhausted by the calls of agriculture and evaporation.

“The process of preparing new lands begins as early in the winter as the housing and managing the antecedent crop will permit, by grubbing the under growth with a mattock; felling the timber with a poll-axe; lopping off the tops, and cutting the bodies into lengths of about eleven feet, which is about the customary length of an American fence rail, in what is called a *worm* or *panel* fence. During this part of the process the negro women, boys, and weaker labourers, are employed in piling or throwing the brush-wood, roots, and small wood, into heaps to be burned; and after such logs or stocks are selected as are suitable to be malled into rails, make clap-boards, or answer for other more particular occasions of the planter, the remaining logs are rolled into heaps by means of hand-spikes and *skids*; but the Pennsylvania and German farmers, who are more conversant with animal powers than the Virginians, save much of this labour by the use of a pair of horses with a half sledge, or a pair of truck wheels. The burning of this brush-wood, and the log piles, is a business for all hands after working hours; and as nightly revels are peculiar to the African constitution, this

part of the labour proves often a very late employment, which affords many scenes of rustic mirth.

“When this process has cleared the land of its various natural incumbrances, (to attain which end is very expensive and laborious,) the next part of the process is that of the hoe; for the plough is an implement which is rarely used in *new* lands when they are either designed for tobacco or meadow.

“There are three kinds of the hoe which are applied to this tillage: the first is what is termed the sprouting hoe, which is a smaller species of mattock that serves to break up any particular hard part of the ground, to grub up any smaller sized grubs which the mattock or grubbing hoe may have omitted, to remove small stones and other partial impediments to the next process.

“The *narrow* or *hilling* hoe follows the operation of the sprouting hoe. It is generally from six to eight inches wide, and ten or twelve in the length of the blade, according to the strength of the person who is to use it; the blade is thin, and by means of a moveable wedge which is driven into the eye of the hoe, it can be set more or less *digging* (as it is termed,) that is, on a greater or less angle with the helve, at pleasure. In this respect there are few instances where the American blacksmith is not employed to alter the eye of an *English*-made hoe before it is fit for use; the industrious and truly useful merchants of Glasgow have paid more minute attention to this circumstance.

“The use of this hoe is to break up the ground and throw it into shape; which is done by chopping the clods until they are sufficiently fine, and then drawing the earth round the foot until it forms a heap round the projected leg of the labourer like a mole hill, and nearly as high as the knee; he then draws out his foot, flattens the top of the hill by a *dab* with the flat part of the hoe, and advances forward to the next hill in the same manner, until the whole piece of ground is prepared. The centre of these

hills are in this manner guessed by the eye; and in most instances they approach near to lines of four feet one way, and three feet the other. The planter always endeavours to time this operation so as to tally with the growth of plants, so that he may be certain by this means to pitch his crop within season.

“The third kind of hoe is the *broad* or *weeding* hoe. This is made use of during the cultivation of the crop, to keep it clean from the weeds. It is wide upon the edge, say from ten inches to a foot, or more; of thinner substance than the hilling hoe, not near so deep in the blade, and the eye is formed more bent and shelving than the latter, so that it can be set upon a more acute angle upon the helve at pleasure, by removing the wedge.

Of the Season for Planting.

“The term, *season* for planting, signifies a shower of rain of sufficient quantity to wet the earth to a degree of moisture which may render it safe to draw the young plants from the plant bed, and transplant them into the hills which are prepared for them in the field, as described under the last head; and these seasons generally commence in April, and terminate with what is termed the *long season* in May; which (to make use of an Irishism) very frequently happens in June; and is the opportunity which the planter finds himself necessitated to seize with eagerness for the *pitching* of his crop; a term which comprehends the ultimate opportunity which the spring will afford him for planting a quantity equal to the capacity of the collective power of his labourers when applied in cultivation.

“By the time which these *seasons* approach, nature has so ordered vegetation, that the weather has generally enabled the plants (if duly sheltered from the spring frosts, a circumstance to which a planter should always be attentive in selecting his plant patch) to shoot forward in sufficient strength to bear the vicissitude of transplantation.

“They are supposed to be equal to meet the imposition of this task when the leaves are about the size of a dollar; but this is more generally the minor magnitude of the leaves; and some will be of course about three or four times that medium dimension.

“Thus, when a good shower or season happens at this period of the year, and the field and plants are equally ready for the intended union, the planter hurries to the plant bed, disregarding the teeming element, which is doomed to wet his skin, from the view of a bountiful harvest, and having carefully drawn the largest sizeable plants, he proceeds to the next operation.

Of Planting.

“The office of *planting* the tobacco is performed by two or more persons, in the following manner: The first person bears, suspended upon one arm, a large basket full of the plants which have been just drawn and brought from the plant bed to the field, without waiting for an intermission of the shower, although it should rain ever so heavily; such an opportunity indeed, instead of being shunned, is eagerly sought after, and is considered to be the sure and certain means of laying a good foundation, which cherishes the hope of a bounteous return. The person who bears the basket proceeds thus by rows from hill to hill; and upon each hill he takes care to drop one of his plants. Those who follow make a hole in the centre of each hill with their fingers, and having adjusted the tobacco plant in its natural position, they knead the earth round the root with their hands, until it is of a sufficient consistency to sustain the plant against wind and weather. In this condition they leave the field for a few days until the plants shall have formed their radifications; and where any of them shall have casually perished, the ground is followed over again by successive replantings, until the crop is rendered complete.

Of Hoeing the Crop.

“The operation of *hoeing* comprehends two distinct functions, viz. that of hilling, and that of weeding; and there are moreover two stages of hilling. The first hilling commences, as heretofore described, in the preparation of the field previous to planting the crop, and it is performed, as before explained, by means of the peculiar implement called a hilling hoe; the second hilling is performed after the crop is planted, with a view to succour and support the plant as it may happen to want strengthening, by giving a firm and permanent foundation to its root; and it may be effected according to the demand of the respective plants by a dexterity in changing the stroke with the weeding hoe, without any necessity to recur to the more appropriate utensil.

“The more direct use of the weeding hoe commences with the first growth of the tobacco after transplantation, and never ceases until the plant is nearly ripe, and ready to be *laid by*, as they term the last weeding with the hoe; for he who would have a good crop of tobacco, or of maize, must not be sparing of his labour, but must keep the ground constantly stirring during the whole growth of the crop. And it is a rare instance to see the plough introduced as an assistant, unless it be the *flook plough*, for the purpose of introducing a sowing of wheat for the following year, even while the present crop is growing; and this is frequently practised in fields of maize, and sometimes in fields of tobacco, which may be ranked amongst the best fallow crops, as it leaves the ground perfectly clean and naked, permitting neither grass, weed, nor vegetable, to remain standing in the space which it has occupied.

Of Topping the Plant.

"This operation, simply, is that of pinching off with the thumb nail* the leading stem or sprout of the plant, which would, if left alone, run up to flower and seed; but which, from the more substantial formation of the leaf by the help of the nutritive juices, which are thereby afforded to the lower parts of the plant, and thus absorbed through the ducts and fibres of the leaf, is rendered more weighty, thick, and fit for market. The qualified sense of this term is applicable to certain legal restrictions founded upon long experience, and calculated to compel an amendment in the culture of this staple of the Virginia trade, so that it shall at all times excel in foreign markets, and thus justly merit a superior reputation. I do not exactly recollect the present limitation by law, which has changed, I believe, with the progress of experience; but the custom is to top the plant to nine, seven, or five leaves, as the quality and soil may seem most likely to bear.

Of the Sucker, and Suckering.

"The sucker is a superfluous sprout which is wont to make its appearance and shoot forth from the stem or stalk, near to the junction of the leaves with the stem, and about the root of the plant; and if these suckers are permitted to grow, they injure the marketable quality of the tobacco by compelling a division of its nutriment during the act of maturation. The planter is therefore careful to destroy these intruders with the thumb nail, as in the act of topping, and this process is termed suckering.

"This superfluity of vegetation, like that of the top, has been often the subject of legislative care; and the policy of supporting the good name of the Virginia produce has dictated the

* "Many of the Virginians let the thumb nail grow long, and harden it in the candle, for this purpose: not for the use of gouging out people's eyes, as some have thought fit to insinuate."

wisdom of penal laws to maintain her good faith against imposition upon strangers who trade with her. It has been customary in former ages to rear an inferior plant from the sucker which projects from the root after the cutting of an early plant; and thus a *second* crop has been often obtained from the same field by one and the same course of culture; and although this scion is of a sufficient quality for smoking, and might become preferred in the weaker kinds of snuff, it has been (I think very properly) thought eligible to prefer a prohibitory law, to a risk of imposition by means of similitude.

“The practice of cultivating suckers is on these accounts not only discountenanced as fraudulent, but the constables are strictly enjoined *ex officio* to make diligent search, and to employ the posse comitatus in destroying such crops; a law indeed for which, to the credit of the Virginians, there is seldom occasion; yet some few instances have occurred, within my day, where the constables have very honourably carried it into execution in a manner truly exemplary, and productive of public good.

Of the Worm.

“There are several species of the worm, or rather grub genus, which prove injurious to the culture of tobacco; some of these attack the root, and some the leaf of the plant; but that which is most destructive, and consequently creates the most employment, is the *horn* worm, or large green tobacco worm. This appears to me to be the same species with that which Catesby has described in the second volume of his Natural History of Carolina, p. 94, under the title *eruca maxima cornuta*, or the great horned caterpillar.

“‘This caterpillar,’ says he, ‘is about four inches long, besides the head and tail; it consists of ten joints, or rings, of a yellow colour; on the head, which is black, grow four pair of

horns, smooth and of a reddish brown towards the bottom, jagged or bearded, and black towards the top; on each of the rings arise short, jagged, black horns, one standing on the back, and two on each side; below which is a *trachæa* on each side; likewise the horn of the back of the last ring is longest: the flap of the tail is of a bright bay colour. It hath eight feet, and six *pupillæ*?

“There are, besides this kind, others without horns; all of them of a green colour, so far as I recollect. And this, in Catesby’s description, differs in respect to colour; this tobacco worm or *horn* worm, as the planters call it more particularly, being of a pale delicate green; an effect I apprehend which proceeds from the colour of its food when it feeds upon growing tobacco plants. The act of destroying these worms is termed *worming* the tobacco, which is a very nauseous occupation, and takes up much labour. It is performed by picking every thing of this kind off the respective leaves with the hand, and destroying it with the foot.

Of the Term “Firing.”

“During very rainy seasons, and in some kinds of unfavourable soil, the plant is subject to a malady called *firing*. This is a kind of blight occasioned by the moist state of the atmosphere, and the too moist condition of the plant: I do not recollect whether the opposite extreme does not produce an effect something similar. This injury is much dreaded by the planter, as it spots the leaf with a hard brown spot, which perishes, and becomes so far a loss upon the commodity. I apprehend there are two stages when the plant is, in a certain degree, subject to this evil effect: the first is whilst growing in the field, the latter when hanging in the tobacco house. I know of no other remedy than constant working the ground while the seed is growing, and careful drying by the use of fire in the tobacco house.

Of the Ripening of the Crop.

“Much practice is requisite to form a judicious discernment concerning the state and progress of the ripening leaf; yet care must be used to cut up the plant as soon as it is sufficiently ripe to promise a good curable condition, lest the approach of frost should tread upon the heels of the crop-master; for in this case, tobacco will be among the first plants that feel its influence, and the loss to be apprehended in this instance, is not a mere partial damage by nipping, but a total consumption by the destruction of every plant.

“I find it difficult to give to strangers a full idea of the ripening of the leaf: it is a point on which I would not trust my own experience without consulting some able crop-master in the neighbourhood; and I believe this is not an uncustomary precaution among those who plant it. So far as I am able to convey an idea, which I find it easier to understand than to express, I should judge of the ripening of the leaf by its thickening sufficiently; by the change of its colour to a more yellowish green; by a certain mellow appearance, and protusion of the web of the leaf, which I suppose to be occasioned by a contraction of the fibres; and by such other appearances as I might conceive to indicate an ultimate suspension of the vegetative functions.

Of Cutting and Gathering the Crop.

“When the crop is adjudged sufficiently ripe to proceed to cutting, this operation is assigned to the best and most judicious hands who are employed in the culture; and these being provided each with a strong sharp knife, proceed along the respective rows of the field to select such plants as appear to be ripe, leaving others to ripen; those which are cut are sliced off near to the ground, and such plants as have thick stalks or stems are sliced down the middle of the stem in order to admit a more free and equal circulation of air through the parts during the process

of curing, and to free the plant, as far as possible, from such partial retention of moisture as might have a tendency to ferment, and damage the staple. The plants are then laid down upon the hill where they grew, with the points of the leaves projecting all the same way, as nearly as possible, so that when the sun has had sufficient effect to render them pliable, they may more easily and uniformly be gathered into *turns* by the gatherers who follow the cutting.

Of Gathering the Crop in.

“For the better comprehending the method of gathering the crop, it is necessary to understand the preparation which must be previously made for facilitating this part of the process.

“In preparing for gathering the crop of tobacco it is customary to erect a kind of scaffold in various places of the tobacco ground which may happen to offer a convenient situation. This is done by lodging one end of several strong poles upon any log or fence which may be convenient, and resting the other end of such poles upon a transverse pole supported by forks, at about five feet from the ground; or by erecting the whole scaffold upon forks if circumstances require it.

“In forming this part of the scaffold in the manner of joists, the poles are placed about four feet asunder from centre to centre, so that when the sticks which sustain the tobacco plants are prepared they may fill the space advantageously by leaving but little spare room upon the scaffold.

“Timber is then split in the manner of laths, into pieces of four feet in length, and about an inch and a half diameter. These are termed the *tobacco sticks*; and their use is to hang the tobacco upon, both by lodging the ends of this stick upon the poles of the scaffold which have been previously prepared in the field, in order to render it sufficiently pliable and in condition to carry into the tobacco-house, to which it is now convey-

ed by such means as the planter has in his power ; and by suspending it in the same way in the house, so that the air may pass through it in the process of curing. Instead of this particular method, those who prefer to do so, lay it a short while in bulk upon poles, logs, &c. in the field, before they convey it under cover."

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